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OIL WORLD

and Petroleum Industry

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IN ACHIEVING VICTORY, America will owe *much* to oil! Much, because of the research, ingenuity and fortunes expended by the Petroleum Industry. Today, at action's hand, are a host of vital-to-victory essentials . . . *all from oil!*

Victory's cloak of oil is indeed a priceless one. All America is quickly learning that due to oil our armed forces will not lack rubber,— that high-octane aviation gasoline will never be rationed to our flyers,— that "block-busting" explosives come from Toluene, a petroleum derivative,— that petro-chemical synthetics, like plastics, conserve critical metals.

Today, petroleum is also playing a tremendous role in the factories, in the homes, on farms and on foreign fields. In the tomorrow that follows the Peace, Americans will enjoy new comforts of life that will be theirs by virtue of Petroleum's labor.

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Vol. 35
No. 21
Whole
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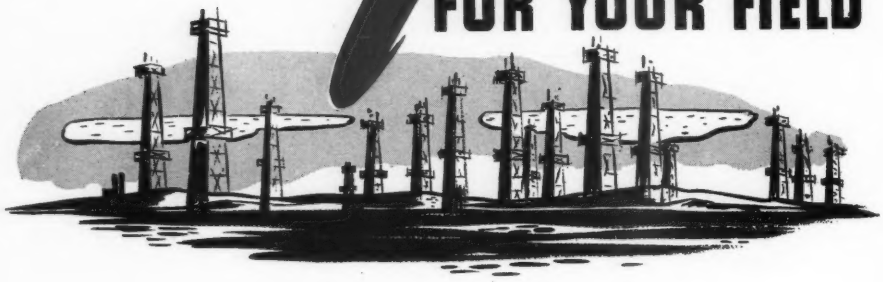

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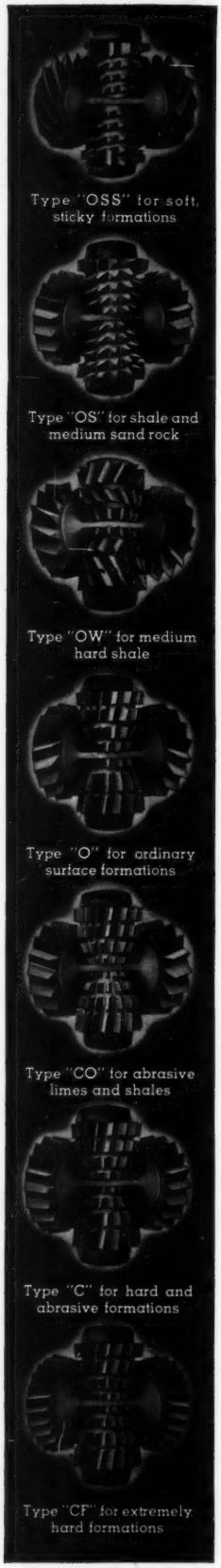
Type "OSS" for soft, sticky formations
Type "OS" for shale and medium sand rock
Type "OW" for medium hard shale
Type "O" for ordinary surface formations
Type "CO" for abrasive limes and shales
Type "C" for hard and abrasive formations
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CALIFORNIA
OIL WORLD
and Petroleum Industry

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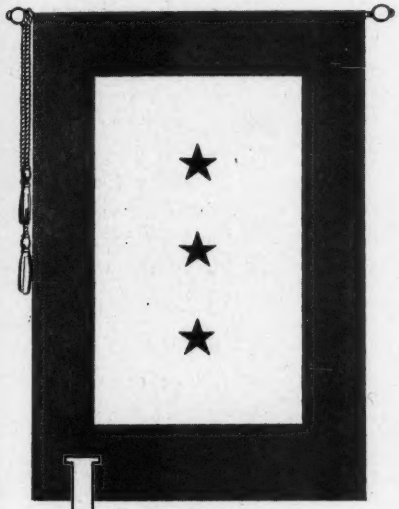

In the service of our country

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WALTER C. MONROE President and Editor
KINZIE MILLER Vice President

V. W. HEINZERLING, Manager California Oil World News Service and California Oil World Reference Edition

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November 14th, 1942

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Administrative Highlights .

Price Raise Advocated

Stating that OPC and WPB priority assistance for wildcat wells has not resulted in discoveries of much needed new reserves, Congressman Wm. P. Cole, Jr., in a letter to President Roosevelt blames the lack of wildcatting and discoveries squarely on inadequate prices for oil.

"No kind of legerdemain or cajolery will induce practical men to invest capital where, on the average, they cannot expect to get their capital back," Congressman Cole says. The letter was in the nature of an informal and personal report of Cole's 12-year experience as chairman of the Oil Subcommittee of the House Interstate and Foreign Commerce Committee, from which he is resigning to become a Federal judge in New York.

Congressman Cole's committee has held two hearings in California, one during the NRA days and one early in 1937, and the California oil industry is generally well acquainted with its work.

On the subject of crude prices, the letter says that it is necessary to take steps "to make feasible the continued operation, with rising costs, of stripper wells, the rehabilitation of shutdown wells, and the use of secondary operations in fields depleted by primary means.

Subsidies Criticized

"Those people who have considered the form which these incentives to drilling should take, suggested subsidies of one nature or another, or have suggested that proper adjustments be permitted in the prices of the crude petroleum and the petroleum products so as to adjust the various components of the industry to a proper economic balance.

"For subsidies to accomplish all that needs to be done, it would be necessary for them to cover the continued production of stripper wells, the rehabilitation of abandoned wells in which there remains some recoverable oil and the secondary recovery operations which have proved so successful" in certain fields.

Pointing out that the industry has suffered severe dislocations caused by the war, Congressman Cole's letter says: "An adjustment in the price of oil and a collateral adjustment in the price of products is a necessary war measure to insure the drilling of 'wildcats', to continue production of stripper wells, to rehabilitate wells long shut down and make possible secondary recovery operations in many fields where the oil is needed.

"With the restrictions which are now going into effect on the unessential uses of petroleum products, all oil consumed becomes an essential war product, and cannot be considered in the category of any other product consumed by the public that might be a contributing factor towards general inflation. Inflation has already taken place in every other commodity except oil, whose price is three-fourths that of 1926, the fixed standard year for commodities.

"We are certainly headed towards disaster, Mr. President, if we cannot make provision at this time for an increased supply of nearby petroleum."

Centralization Urged

Congressman Cole recommends the centralization of control over oil, saying: "It is not a sound administrative policy to have the direction of production, refining and transportation of petroleum products in the hands of one bureau and the regulation of the price, which is the sole means of assuring us of these necessary products, in the hands of another bureau who has neither the experience, the personnel, nor the responsibility for the production, yet in fact has complete control of the amount of production of this product through price control."

After stating that we have discovered new reserves equal to only one-half the amount of oil consumed in recent months and mentioning other phases of the over-all oil picture, Congressman Cole says that in his belief, no immediate oil legislation is necessary. He then says that under the pressure of war, it is necessary that oil problems be met as rapidly as they arise and that "legislation goes into effect too slowly to accomplish these purposes, and as oil is such a desperate and ever-pressing necessity for our war needs, I believe that the entire problem should be placed in the hands of one man, during the war period only, who has the organization available to furnish the information and to dictate the following things:

"(a) to restrict or encourage the drilling for oil.

"(b) To acquire under the War Production Board essential materials, strategic or otherwise, for the development of oil refining and pipelining, in such amounts as may be designated by the Armed Forces.

"(c) To set whatever prices may be necessary over the products to insure their production, processing and delivery in the needed quantities and types."

Recommendations

The mineral resources subcommittee of the Senate Public Lands Commitee, which recently completed open forum discussion of the problems facing the oil industry, has filed an interim report in which it declares that the United States is facing a crisis in oil similar to the crisis in steel and rubber.

Reason for the crisis is that Fed-

WHAT IS YOUR ACTUAL DEHYDRATION COST ?

Because dehydration is just one step in the proper conditioning of crude oil for marketing, producers sometimes believe that when they obtain a low per barrel dehydrating cost, their emulsion problem is settled.

This is true only if the low per barrel cost is *actual*. If lowered gravity and intangible volume losses due to evaporation or excessive heating costs are being overlooked, your "low" dehydration cost is merely theoretical. Time after time Petreco engineers have shown producers that gravity losses of 1° API result in volume losses up to 2½%. On one lease, the gravity and volume losses amounted to *six cents per barrel!*

Don't dismiss an apparently low dehydration cost as the final settlement of your demulsification procedure. Have a Petreco engineer survey your present, or proposed method. His will not be mere "lip service"

● . . . he will give you a written report, quoting facts and figures, obtained on your lease, from samples of your crude. Why not avail yourself of this service? There is no obligation.

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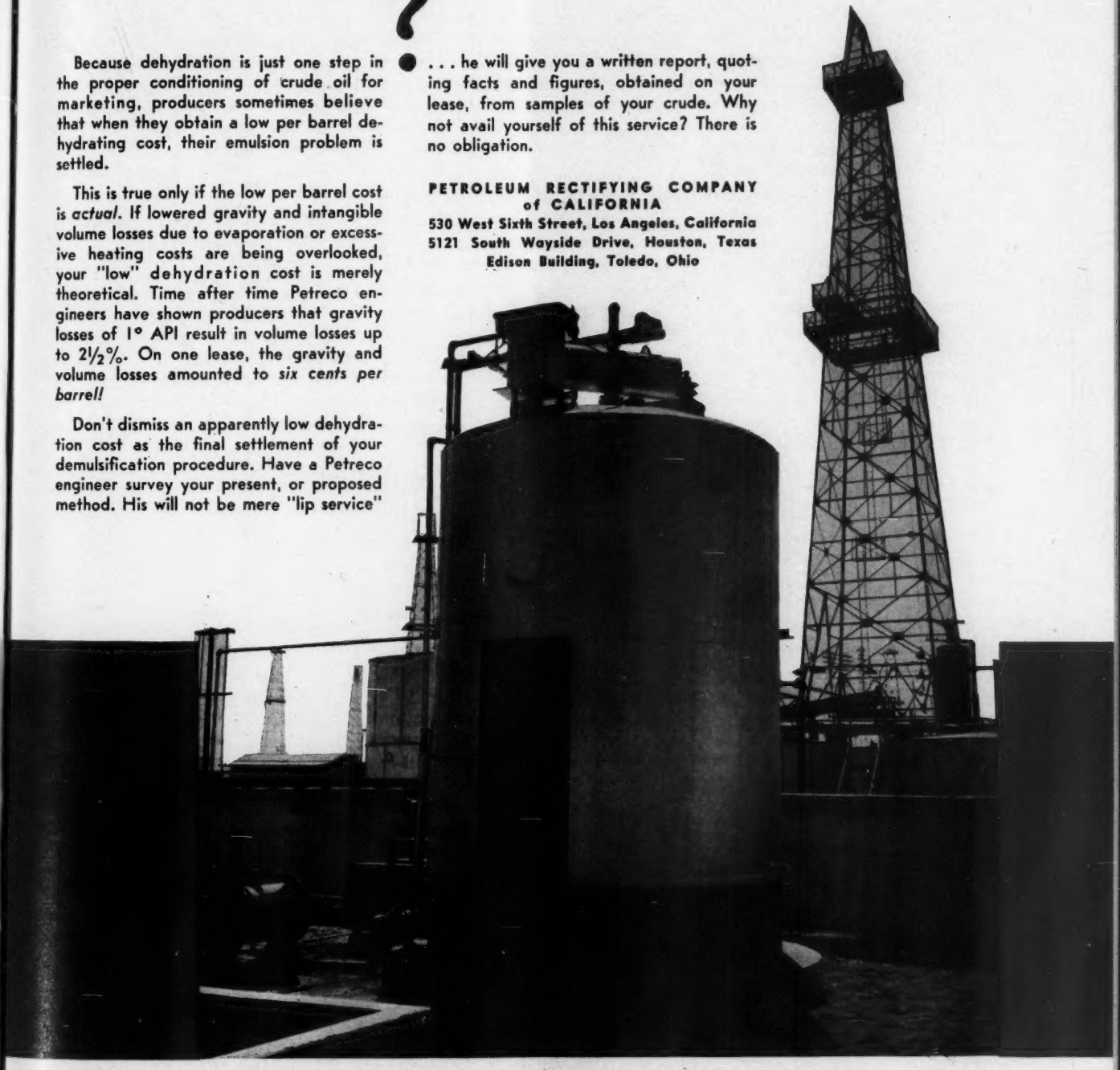

PETRECO
DEHYDRATING DESALTING

eral agencies having jurisdiction over the oil industry are not coordinated, the report said.

The committee makes five recommendations to remedy the situation:

1. Enactment of a bill (S. 2239) to reduce the royalty on government leases to a flat 12½ per cent, thus encouraging development of such leases.

2. RFC aid to finance exploratory drilling under present RFC authority.

3. Coordination of all Federal oil agencies.

4. Pending such coordination, a correlation of OPC and WPB policy as to materials for the oil industry.

5. Immediate utilization of all known processes to manufacture steel, so that more materials for equipment, pipelines, etc., would be available to the industry.

On the matter of price of oil and its products, which engaged the attention of many witnesses who participated in the discussions held by the committee, the report said:

"This is an issue which is beyond the jurisdiction of this Committee but it is one that goes to the heart of the present economic crisis."

New Materials Plan

A new plan, which includes the oil industry, has been announced by WPB as a means of controlling distribution of materials.

The new plan is to become mandatory after July 1, 1943, but will be inaugurated during the second quarter of the coming year ,and will completely replace the present priorities system.

The plan is known as the "controlled materials plan," and will require that all prime contractors list their own, as well as their subcontractor's requirements for material, which lists will then be submitted to "claimant agencies"—the Army, Navy, Maritime Commission, Aircraft Scheduling Unit, Lend Lease, Board of Economic Warfare, and the Office of Civilian Supply. In the case of the oil industry, such lists will be submitted to the OPC.

All of these agencies will submit the materials lists to the WPB requirements committee which will bring demand into balance with supply and allocate specific quantities of materials to the claimant agencies which will distribute such allotments among contractors by means of allotment numbers. These allotment numbers will constitute a right to receive delivery.

The first bills of materials—covering requirements for carbon and alloy steel, copper and aluminum—are to be assembled by claimant agencies during November and December, and on January 1 the claimant agencies will submit their first estimates to the requirements committee, through WPB branches handling controlled materials. By the following March 15, after the lists have been processed by the WPB and allotments determined, users of materials will have placed authorized orders for delivery in April and for subsequent months as authorized.

What effect the new plan will have on the proposed OPC-sponsored "materials and supplies" committees is not known at present. It is known, however, that some revision in the priorities system has become necessary since preference rating numbers have been granted greatly in excess of the available quantity of material, with the result that the ratings have been becoming worhless.

Pooling of Materials

In a speech delivered by phone from Washington to Wichita, Kansas, Coordinator Ickes told the annual meeting of the Independent Petroleum Association of America that a method of "redistributing excess equipment inventories in the oil industry will be ready within the near future," although he said that nothing specific had been prepared at the time the speech was being made.

It is known that Deputy Coordinator R. K. Davies has asked that each district general chairman nominate men to form district "committees on joint use of facilities" and other men to form "committee on materials and supplies," but no announcement has yet been made as to the progress being made along this line.

The matter of distribution of supplies throughout the industry has been under discussion by the industry through the Petroleum Industry War Council and the OPC for a number of months. Several starts toward compiling an inventory of all materials in the hands of the industry have been made, but in each case, objections to the method, or to the form of inventory, or to the detailed information sought, have held up progress.

Materials Committees

Organization of "committees on materials and supplies" was suggested as a solution to the problem, the committees generally to have authority to make district inventories, and to recommend redistribution, or reallocation of the materials in the various districts.

In his speech, Coordinator Ickes emphasized that there is not enough material for all purposes and that ways must be found to make the most of what is on hand in the nation. He said that the WPB had already taken the position that the oil industry should utilize, as far as possible, the inventories which it has on hand before it can expect much consideration of requests for substantial amounts of new material.

On the matter of prices, he suggested that the industry take a look at the facts to find out whether price increases are necessary to stimulate exploration and new discoveries. He said that OPC would do all it could to find the materials necessary, but warned that the coming year will be even more serious than the current year with respect to the availability of both material and manpower.

Commenting on the speech, Frank Buttram, president of the IPAA, said that he was disappointed in the posiion taken by the Coordinator on prices, and that he hoped and believed that "we will yet see the day when he will join up wholeheartedly with us."

Pooling in East

The first step toward pooling of facilities has been taken by the industry on the east coast. In that

area, all tank-car and other shipments are pooled, in order that the fullest possible use of available transportation facilities can be made. The Standard Oil Co. of New Jersey, in "The Lamp", comments that the arrangement has elements of socialization of industry, but that it is necessary in the effort to win the war.

Similar programs are implied for other branches of the industry and throughout the nation, rather than just on the east coast where transportation shortages are the cause of difficulties, when the "committees on joint use of facilities" are set up. These committees are to be charged, according to present plans, with the responsibility of finding instances where joint operation of oil industry facilities will result in lower material and manpower requirements.

M-68 Revision?

Discussion of a revision of M-68 seems to indicate that tighter control over drilling will soon be undertaken, so that consumption of steel through the industrys use of drilling equipment can be confined to those areas where oil is short.

It is likely that under such control, California would qualify for material.

Reports are that individual studies of each well for which permits are sought will not be made, but that applications for permits to drill in areas where demand exceeds present ability to produce efficiently will be granted, while in areas where there is an oversupply of oil they will be denied.

Extra "Gas" for Industry

As an "extractive industry," the oil industry is included among those eligible for "C" or supplemental gasoline allotments for business and industrial use, provided that the particular use of the car makes it eligible for additional amounts of gasoline.

In order to be eligible for "C" rations, the cars must be in use by "workers, including executives, technicians and office workers, for necessary travel to, from within, or between military and hospital establishments, public utilities and industrial, extractive or agricultural establishments essential to the war effort, for purposes necessary to their functioning or operation. This does not include travel for sales, promotional, and certain other purposes." In addition to the one quoted, there are 19 other occupations eligible for "C" rations.

According to an OPA release, no one can obtain gasoline for more than 470 miles of driving per month unless he is within one of the preferred mileage classifications. For occupational driving, supplemental rations will not be allowed unless the applicant forms a ride-sharing club and even then the area in which he lives must be inadequately served by public transportation facilities.

Use of gasoline by the oil industry itself, for passenger cars, trucks, and stationary equipment, was discussed at a recent meeting of a number of oil men with representatives of the OPA.

Function Explained

These OPA men pointed out that the principal funcion of the rationing system is to insure that for each gallon of gasoline sold, there is a coupon or other evidence that the sale was made in accordance with rationing regulations. With that understanding, it was pointed out that gasoline could be kept in storage tanks on leases and distributed by the owner to his various types of motorized equipment as he saw fit; that it could be secured under either a bulk certificate or individual coupons; that it could be purchased and delivered from a service station into the tank on an automobile or truck; or that it might be secured through other alternative channels.

It was also pointed out, however, that if gasoline were secured for one purpose and used for another, and that if such misuse were continued and deliberate, there was a provision in the law which would subject the offernder to a maximum fine of $10,000 or 10 years in jail, or both.

The owner of a fleet of passenger cars may apply for his gasoline ration either at the local rationing board nearest his headquarters office, or at the board nearest the place where the car is garaged. He will be expected, however, once he has made his decision, to follow the same practice in the future.

Bulk Certificates

In the case of fleets of cars and trucks together, the owner will come under the OPA regulations insofar as his passenger car fleet is concerned, and ODT regulations for his trucks. The ODT Certificate of War Necessity, issued for trucks, includes an allotment of gasoline, which will be granted by the OPA organization without further question of the owner's needs. On passenger cars, the OPA will allot the amount of gasoline which the car may use, and issue coupons or bulk certificates to cover that amount. In the case of non-highway uses of gasoline, such as for pulling units, drilling equipment, tractors, etc., the owner will apply through OPA for the amount of gasoline necessary for their operation, based upon his use of gasoline in the past. Certificates or coupons will be issued to cover these requirements.

An oil operator who may have all types of uses for gasoline, and who has a bulk storage tank on his lease, may total all of his gasoline allotment and have it delivered in bulk to his storage tank, as has been customary in the past. He is not required to state the amount of gasoline he may have on hand, but it is pointed out that for all of his trucks and passenger cars, mileage records will be kept, and if there is large discrepancy between his alloted mileage and his actual mileage, that fact will be sufficient cause for inquiry into his use of gasoline.

Car-sharing Required

The industry is also included in the OPA requirement that employers of 100 or more employees establish "organized transportation plans" to assure workers adequate means of getting to their jobs despite gasoline rationing restrictions.

Immediate steps to organize such transportation plans are recommended by the OPA, since applications for a supplemental gasoline ration will be made immediately after the clos-

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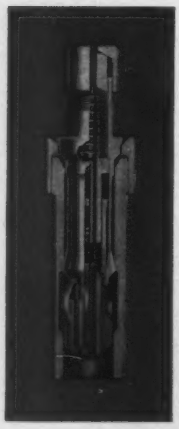
useful for every wire line job!

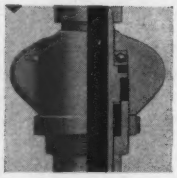
HERE'S the tool that gives you all the advantages of a poor-boy swivel for rotating pipe and circulating to keep the well under control . . . and on top of that gives a pressure-proof wire line pack-off to hold gas and oil inside the flow lines. *It's the Bowen Pressure Control!*

With this one compact unit you can run wire line core barrels and surveying instruments under pressure—*with safety*—swab for production tests, keep the pipe free, maintain circulation and have a dry and *safe* rig floor. You have in one tool all the safety and operating convenience you normally get only by combining several individual tools!



4 RUGGED PARTS INSURE *Complete Control*

This *Packing Unit* on the Bowen Pressure Control prevents gas or fluid leakage and wipes the line clean as a whistle. It automatically locks in position when tools are lowered in the hole, and automatically releases when struck by outcoming tools.



See that *Automatic Lock*? It snaps into position, as the tools are lowered, *and no amount of pressure can blow it out.* Yet when struck by the rope socket it releases the packing unit *instantly*. Eliminates need for flagging the line—speeds your operations.

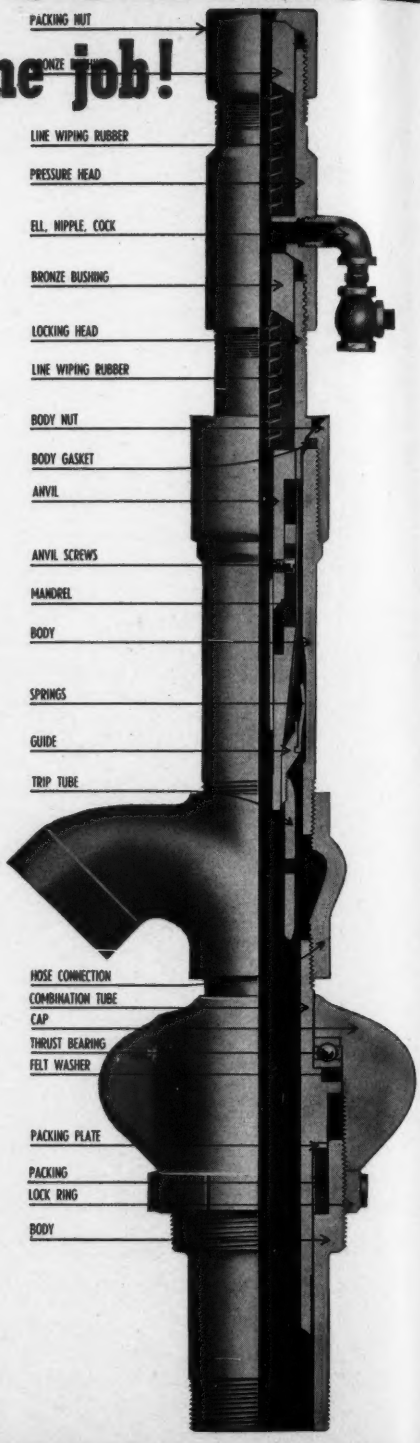
With this *Gooseneck Connection*, you can attach the regular rotary hose and keep up circulation to prevent pipe sticking. Takes any pressure you need for control, and doesn't choke back the flow!

This lubricated ball-bearing *Swivel* permits full rotation of the drilling string to further prevent freezing the pipe. It rotates with the table while the Gooseneck Connection above remains stationary—and circulation is continued for proper well control.

Use the Bowen Pressure Control in your production work—wherever you want maximum well control during wire line operations. Available from your nearest Bowen Service Store—day or night—in sizes to fit your drilling string. Sold outright for export only.

← FOR PACKING OFF WIRE LINES

. . . when the circulating swivel and high pressure extension described above are not required, the Bowen Line Wiper shown at left is the ideal tool. It is a completely automatic unit that keeps the wire line clean, prevents gas or fluid leakage and maintains a dry and safe rig floor. Pressure-proof . . . fully automatic locking and releasing action . . . simple, sturdy and safe. **Available from Bowen headquarters in your territory—sold outright for export only.**



BOWEN FISHING TOOL CO.

SANTA FE SPRINGS, CALIFORNIA

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CASPER, WYOMING

ing date of applications for the basic ration, which now are scheduled for November 18 to 20, inclusive.

ODT Regulations

Two regulations of the ODT, recently issued in connection with the requirements that all motor trucks must carry a Certificate of War Necessity in order to secure gasoline, parts, tires, and all other equipment, are of interest to the oil industry.

One of the regulations is an interpretation and definition of what constitutes a "part." The general counsel of the ODT has defined "part" to include a crane, hoist, winch, or other accessory which "is, or is to be, mounted or installed upon a commercial motor vehicle so as to become a part thereof, either permanently or temporarily." Under the definition, such a "part" cannot be purchased except under the ODT regulations.

The other requirement is that a lessee of a truck must have a Certificate of War Necessiy if the period of the lease is for seven or more consecutive days. The seven-day period of the lease also includes a combination of separate leases which may cover a period of seven days or more, or a lease or combination of leases which provides for the leasing of a truck for periods of less than seven days but with only short breaks between leases.

Both lessor and lessee are made responsible for the carrying out of the requirement.

No Drilling Price Control

Specific exemption from maximum price regulations has been given the drilling of oil and gas wells and the extinguishing of oil well fires, according to a recent announcement of the OPA.

The exemption was granted following an appeal by the American Association of Oil Well Drilling Contractors, after a local OPA office in Texas had ruled that charges for such services came under the general maximum price regulation.

The exemptions cover all necessary operations in connection with well drilling, such as preparation of location, fishing jobs, pulling, salvaging, and plugging operations.

Steel Tanks Sought

A plea for used steel tanks, of from 500 to 80,000 barrels capacity, has been made by the Los Angeles office of the U. S. Engineer. The tanks are to be used to store aviation gasoline at airports now under construction, and are urgently needed because the War Production Board has prohibited the use of new steel plates for such purposes.

According to the engineer's office, almost any type of steel tank can be used, and will be purchased on the spot by the government. Dismantling, if necessary, transportation ,and erection at the new site will all be handled by the Engineer's office. Light gauge tanks will be used as liners and encased in concrete, while heavier gauge will be used without the concrete casing.

W. E. Buescher and R. C. Sharp are the engineers in charge of the program. They are located in the branch U. S. Engineer Office at 7th and Bixel Streets, Los Angeles, telephone TUcker 1311, extension 629.

Dimout Variance

A temporary variance from the dimout regulations to permit uninterrupted drilling and servicing of oil wells has been obtained by the Oil Industry Protection Committee from the Ninth Regional Defense Board. The variance permits the use of a total of 3000 watts of light for drilling rigs and 1500 watts for each well being serviced, provided no light is emitted above the horizontal plane of the fixture.

In addition, the variance, which expires on November 25 unless sooner revoked, permits the use of light directed up into the sky during actual pulling of rods and tubing from wells, provided the wattage of the light or lights does not exceed a total of 200. The Oil Industry Protection Committee is at present engaged in formulating a recommendation for a permanent variance, which will probably be along the lines of the temporary variance now in effect.

In requesting the variance, the Committee pointed out that under the terms of Proclamation No. 10, issued by Gen. J. L. DeWitt, safe and efficient conduct of drilling and producing operations at night were practically an impossibility.. The Committee explained that it was extremely unsafe to conduct operations at night with less than one foot candle of illumination as required by the proclamation because of the speed and power of machinery and the fact that equipment, tools and surroundings generally are very dark in color.

Wells Affected

At present there are approximately 102 drilling wells that would be affected by the order. In addition, there are about 16,000 producing wells in the state, most of which operate at night without servicing, but which might require night servicing in an emergency.

The defense board in granting variation from the order made it clear that lights must be shielded so that no direct rays are emitted above the horizontal, except that lights visible from above, but not from the sea, may be used while pipe or rods are being run or pulled. Total power of such lights must be limited to 200 watts and outdoor ground illumination kept to a minimum as far as possible without reducing the efficiency of protection. The order, the board stated, is subject to revocation at any time.

Pumping Equipment Survey

Further possible revision of Conservation Order M-68, which was recently liberalized to permit the reworking of old wells and the installation of artificial lifting equipment in heavy oil fields, as well as the clearance of many applications for exceptions to the order, depend upon the information developed from the current survey of oilfield pumping equipment being carried on jointly by the Conservation Committee of California Oil Producers, the Production Committee for District No. 5, and the District No. 5 Office of Petroleum Coordinator, according to a report at the regular October meeting of the Conservaion Committee.

The statement was made by E. E. Pyles, Chairman of the District Pro-

duction Committee, who has just returned from Washington.

The survey, undertaken approximately a month ago, is nearly completed, according to Lot Bowen, chairman of the committee in charge, with data from individual operators now being compiled by the local OPC, after which it will be forwarded to Washington and used to substantiate further recommended amendments to the order so that full utilization of California's potential heavy oil production can be realized.

Committee Appointing Urged

R. P. Huggins, chairman of the Conservation Committee, stressed the urgency of the appointment of field engineering committees to assist in the development of allocation formulae in the various fields of the State, as well as to assist in the deermination of the maximum efficient rate of production for the fields. The latter is important because the maximum efficient rate is used in calculation of the field allowable and is one of the factors which determines the amount of oil each field produces.

A. C. Rubel, chairman of the Oil Industry Protection Committee, reported on his committee's efforts to prepare the industry for any eventuality resulting from sabotage or other catastrophes resulting from the war. Mr. Rubel said that the principal work of his committee had been to coordinate the various groups charged with anti-sabotage responsibilities, and that it had become the central point of oil industry contact with these other groups, which include the military forces, the Office of Civilian Defense, state and local governments, and other oil industry groups.

Schedule Explained

W. R. Wardner, Jr., Oil Administrator, discussed some of the principal features of the allocation schedule for November, which allocates the same amount of production as the October schedule, 738,000 barrels of crude per day and 44,000 barrels of other petroleum liquids, making a total petroleum allocation of 782,000 barrels per day. The schedule was modified, however, to increase allocations to fuel yielding crudes and further decrease, on a percentage basis, allocations to light crudes.

The schedule, as submitted, has been approved by the OPC in Washington, according to advices received by the Production Committee for District No. 5.

L. E. Porter, chairman of the allocation subcommittee of the Conservaion Committee, reported on a number of restricted pools in which specific intra-pool allocation plans have been adopted, outlining the factors used in the formulae for these pools.

Fuel Demand Off

An increase of 64,000 barrels per day in supply, together with a decrease of 29,000 barrels daily in consumption as compared with August, resulted in a Sepember addition of 63,233 barrels per day to residual fuel oil stocks, according to the "Petroleum Situation in the Pacific Coast Territory," prepared by E. T. Knudsen of the U. S. Bureau of Mines. The Bureau comments that in September, for the first time in 1942, heavy fuel oil supply exceeded requirements.

This surplus of fuel oil supply was due to a drop in demand (thought to be temporary), higher refinery runs, increased transfers from crude, and a slightly increased crude production level. Higher refinery activity, however, resulted in a withdrawal of 18,000 barrels daily from non-gasoline bearing crude stocks, partially offsetting the increased fuel oil stocks.

Statistics Summarized

Crude production increased 1000 barrels per day in September to 726,000 daily, compared with 725,000 daily in August. Gasoline and naphtha distillates production was 259,000 daily compared with 252,000; gas oil and diesel oil production was 98,000 daily compared with 86,000; fuel oil production was 314,000 daily compared with 276,000 daily.

Demand compared as follows: gasoline, 249,000 per day in September, compared with 236,000 in August; gas oil and diesel oil, 59,000 compared with 62,000; fuel oil, 326,000 compared with 355,000; total (including other products in addition to those listed), 753,000 compared with 787,000.

Comparative figures for the first nine months of the current year and the like period of last year are: Crude production, 660,000 barrels daily in 1942 against 626,000 in 1941; gasoline production, 229,000 against 233,000; gasoline demand, 232,000 against 238,000; gas oil and diesel oil production, 83,000 against 89,000; gas oil and diesel oil demand, 66,000 against 71,000; fuel oil production, 247,000 against 225,000; fuel oil demand, 343,000 against 225,000; total demand, 749,000 against 704,000.

Sales Decline Eases

Sales of taxable gasoline in California in September showed a lesser decline than has been the case during recent months, according to the State Board of Equalization, which reports that September sales were 164,456,489 gallons, a 10.77% decline compared with the like month of last year.

This decline compares with an average of approximately 15% during recent months.

Taxes levied against September sales totaled $4,933,694.71, bringing the total to $43,470,412.15 for the first nine months of the current year, compared with $47,311,479.99 for the like period of 1941.

While the Board of Equalization statement says that "a leveling off in the recent reduction of gasoline taxes was indicated," oil industry observers believe that in all probability the leveling off is but temporary, since the incidents of gasoline rationing in California late this month, taxable sales will undoubtedly be greatly restricted.

There is some thought, however, that the figure for October—and even for November—may be relatively high, since many motorists facing gasoline rationing will undoubtedly use their cars for last-minute trips.

Indicating the results of lowered gasoline sales, manpower problems, dimouts, and other difficulties facing service station operators, the Marketing Committee for District No. 5 has reported that as of October 1, 2459 service stations had closed in

California. This was an increase of 339 stations compared with the September 1 figure.

72-Hour Operation

In view of the closing of stations, the lack of manpower, and imminent nation-wide gasoline rationing, the Petroleum Industry War Council at its last meeting recommended that the limitation of service station hours now prevailing on the east coast be extended throughout the nation on November 22, the effective date of nation-wide rationing. This limitation—72 hours per week with certain exceptions for emergency service, truck service, and others — has worked out satisfactorily in the heretofore rationed area, according to the Council resolution, which asks the Petroleum Coordinator to secure an amendment to L-70 (the WPB limitation order which established service station hours) extending it throughout the nation.

The ten leading sellers of taxable gasoline in California during September were, in order of taxable sales: Standard Oil Co., Shell Oil Co., General Petroleum Corp., Union Oil Co., Tide Water Associated Oil Co., Richfield Oil Corp., The Texas Co., Wilshire Oil Co., Douglas Oil and Refining Co., and Rothschild Co. These companies sold a total of 138,317,225 gallons during the month, leaving 26,139,264 gallons sold by all other companies.

Scrap Collection

A form of affidavit to be signed by the purchaser of scrap material has been developed by the California Oil Industry Salvage Committee, to insure that oil industry scrap will be turned over to steel mills and not retained by the purchaser as second hand material.

The affidavit also states that the purchaser is offering a price for the material which does not exceed the maximum established by the O. P. A. and that he will not dispose of the material in violation of the applicable O. P. A. order.

Affidavit Prepared

In furnishing the form of affidavit the California Oil Industry Salvage Committee, of which Paul Shoup is chairman and Lloyd Williamson vice-chairman, says in a covering letter:

"At various meetings of the California Oil Industry Salvage Committee considerable time has been devoted to the discussion of seeing to it that all purchasers of scrap from the oil industry convert their entire purchases to the preparation yard so that it eventually becomes remelting scrap for the steel mills.

"To this end a meeting was held with a committee representing the leading scrap dealers who have approved the attached form which will permit the sellers of scrap in the oil fields to request that the purchaser sign the attached form, indicating that all materials so purchased will be used as described and will not be resold by the buyer as usable salvaged material.

"This should eliminate the objections received from many district chairmen and committeemen which indicated that they were reluctant to sell certain materials as scrap for fear it would not be routed properly through the preparation yards and to the steel mills."

Form of Affidavit

The "attached form" referred to is:

"The bidder hereby affirms that the price or prices herein bid have been compared with the maximum prices established by the Office of Price Administration with respect to the property in question, and that they do not exceed such maximum prices. The bidder also agrees that if this bid is accepted, no property so awarded will be sold or otherwise disposed of in violation of the price schedule of the Office of Price Administration (at present No. 4 revised), and that the materials purchased under this bid will be disposed of only as scrap, for remelting purposes only."

Particular emphasis is being laid on the collection of dormant scrap, defined in a WPB statement as "obsolete machinery, tools, equipment, dies, jigs, fixtures, etc., which are incapable of current or future use in the war production effort because they are broken, wornout, irreparable, dismantled, or in need of unavailable parts necessary to practical reemployment." Emphasis being placed on this form of scrap does not, however, diminish the need for production scrap. "Both types are needed to furnish enough scrap to meet the 12 million ton goal," according to the statement.

Ventura Price Raised

Shell Co., lessors in the Ventura Avenue field, will henceforth receive the prices paid them before Price Order No. 88, which establishes ceiling prices on crude and its product went into effect.

Under Amendment No. 33, the OPA recognizes that certain lessors had been receiving approximately three cents per barrel more than the posted price in the field for their royalty oil, but were forced to the posted level when Order No. 88 went into effect. The Shell Co. has agreed to pay all accrued royalties on the new basis.

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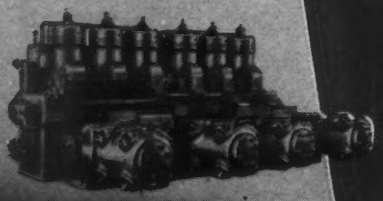

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Chemical Utilization of Natural Gas & Natural Gasoline Hydrocarbons by Oxidation

By Hooper Linford

Introduction

Natural gas and natural gasoline are composed primarily of mixtures of the simpler or lower molecular weight paraffin hydrocarbons. Although the paraffins were originally thought to be inert chemically, they are actually chemically active and are readily converted into various widely different chemical derivatives. Moreover, the huge supplies and low values of both of these commodities make them particularly suitable as basic raw materials for the manufacture of organic chemicals. Although there are several general processes being used to synthesize organic chemicals from hydrocarbons, the object of this paper is to point out some of the potentialities of processes involving oxidation.

Natural Gas

Natural gas consists primarily of methane, but usually contains ethane, propane, and higher molecular weight paraffin hydrocarbons in decreasing proportions together with small percentages of nitrogen, carbon dioxide and occasionally helium. The greater part of the natural gas produced in the United States is treated for the removal of natural gasoline and the dry gas used as a fuel for both domestic and commercial purposes, although until recently enormous quantities of natural gas have been burned or vented to the atmosphere.

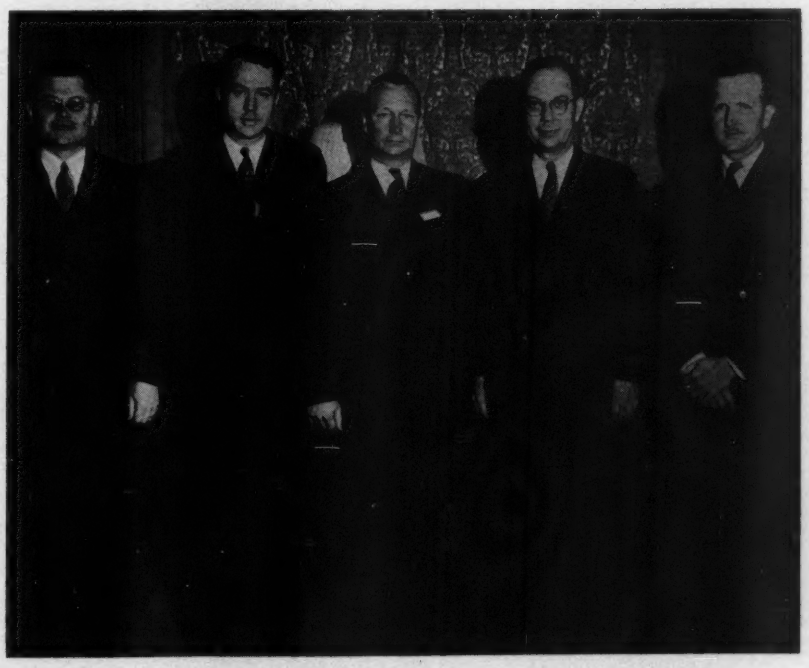
According to figures presented by the Bureau of Mines[2] the estimated production of natural gas in the United States in 1939 was 3,333,500,000,000 cubic feet. Of this amount 2,476,756,000,000 cubic feet, or about 74 per cent was marketed; 856,744,000,000 cubic feet, or 26 per cent, presumably being used in the oil fields for pressuring wells, etc. or wasted. Roughly, 15 per cent of the marketed gas was used in the production of carbon black and 85 per cent used as fuel. The average value for natural gas in the United States in 1939 was 4.9 cents per thousand cubic feet.

Some interesting calculations have been made to show the weight of natural gas produced in the United States. By making broad assumptions as to its average composition it is estimated that in 1939 there was produced about 100,000,000 tons of natural gas. Assuming that all of the gas was treated for the recovery of natural gasoline, there should have been produced about 9,000,000 tons of natural gasoline, including butane and propane, leaving approximately 91,000,000 tons of the dry gas. This is obviously a rich raw-material source and justifies investigation of its possible chemical utilization.

Natural Gasoline

Stabilized natural gasoline is usually considered to consist of a mixture of the saturated paraffin hydrocarbons from the butanes to the octanes (C_4 to C_8) although it is usually found to contain small proportions of some of the higher molecular weight paraffins. The composition of natural gasoline varies with the source and it is often found to contain varying small proportions of aromatic hydrocarbons such as benzene, toluene and xylene, as well as naphthene hydrocarbons such as cyclopentane and cyclohexane and their simpler derivatives. Natural gasoline is used for blending in the preparation of motor fuels where it has particular value because of its low boiling point range and its rather high knock rating and lead susceptibility.

The total production of natural gasoline in the United States in 1941 amounted to 2,696,568,000 gallons[3]. Although no information is available



Speakers at the C.N.G.A. Annual Fall Meeting, Biltmore Hotel, November 6, 1942. Left to right: Charles T. Reichert, Director of Materials, Office of Petroleum Coordinator, Dist. 5; Dr. R. Robert Brattain, Ph. D., Shell Development Co.; Wright W. Gary, president, The Filtrol Corporation; Alexander Macdonald, Deputy Regional Director, War Production Board; Dr. Hooper Linford, Ph.D., Union Oil Co. of California.

Speakers' Luncheon, C.N.G.A. Annual Fall Meeting, Biltmore Hotel, Los Angeles, November 6, 1942... Beginning at left outside of table and running around to right foreground: R. S. Lytle, Los Nietos Prod. & Refining Co.; Earl Derby, Standard Oil Co. of Calif.; T. L. Taggart, Standard Oil Co. of Calif.; D. S. Kilgour, California Oil & Gas Assn.; R. D. Gibbs, Union Oil Co. of Calif.; Comdr. W. H. Osgood, Office of Petroleum Coordinator, Dist 5; Prof. John F. Dodge, University of Southern Calif.; H. R. Linhoff, Richfield Oil Corp.; Charles T. Reichert, Office of Petroleum Coordinator, Dist. 5; L. V. Cassaday, Lomita Gasoline Co.; Wright W. Gary, The Filtrol Corporation; W. W. Robinson, Jr., The Texas Company; Alexander Macdonald, War Production Board; P. S. Magruder, General Petroleum Corporation; Dr. Hooper Linford, Union Oil Co. of Calif.; R. W. Heath, Signal Oil & Gas Co.; Dr. Robert Brattain, Shell Development Co.; W. C. Dayhuff, Standard Oil Co. of Calif.; H. H. Cary, National Technical Laboratories; H. E. Moulton, Chanslor-Canfield-Midway Oil Co.; Kenyon L. Reynolds, Office of Petroleum Coordinator; Geo. C. McLaren, Standard Oil Co. of Calif.; Dr. Robert Vivian, University of Southern Calif.; W. L. Cowan, Union Oil Co. of Calif.; George L. Tyler, California Natural Gasoline Assn.; Randal Maass, General Petroleum Corp.; R. H. Green, Signal Oil & Gas Co.; Marion L. Arnold, Richfield Oil Corp.; Adolf Pfeil, Del Rey Oil & Gas Co.

Left to right beginning at left inside of table: R. R. Crippen, The Texas Co.; A. H. Bell, Continental Oil Co.; W. N. Roper, Western States Gasoline Corp.; Warren Kraft, Honolulu Oil Corp.; A. C. Lyles, Kettleman North Dome Assn.; John Rogers, Cooper-Beesemer Co.; S. F. Magor, Superior Oil Co.; Wm. Moeller, Jr., Southern Calif. Gas Co.; J. A. Campbell, J. A. Campbell Co.

Left to right beginning at right inside of table: Ben C. Dumm, Allied Supply Co.; J. B. Taylor, Signal Oil & Gas Co.; J. S. Fluor, Jr., The Fluor Corp., Ltd.; F. E. Davie, Shell Oil Co., Inc.; W. A. Kirk, California Southern Oil Co.; M. L. Fort, Pacific Lighting Corp.; C. D. Gard, Union Oil Co. of Calif.; John H. Kunkel, The Fluor Corp., Ltd.

as to the average value of this commodity in 1941, it is believed that it is not far different from the average value for 1940 which was estimated to be approximately three cents per gallon[4]. This gasoline had an average vapor pressure (Reid) of about twenty pounds and was, therefore, a stabilized product from which propane and some of the butanes had been removed. Assuming an average weight per gallon of 5.6 pounds for the natural gasoline the quantity produced in 1941 was about 7,550,000 tons.

Although data are not available for the 1941 production of propane and butane, which are obtained by topping the wild natural gasoline, it has been estimated, on the basis of the 1939 production data, that there should have been produced approximately 102,000,000 gallons (249,000 tons) of propane, 92,000,000 gallons (230,000 tons) of butane and 89,000,000 gallons (220,000 tons) of a mixture of propane and butane. In addition to these two hydrocarbons, small amounts of a pentane fraction are produced for use as a liquid fuel. Calculations based on the 1939 production data indicate that approximately 5,000,000 gallons (13,000 tons) of this fraction were probably produced in 1941.

The above data are presented with the object of pointing out the vastness of the supply of low molecular weight hydrocarbons available in the United States as well as the relatively low values assigned to the products which they constitute. In this latter connection it is interesting that natural gas at 4.9 cents per 1,000 cubic feet is worth approximately 0.1 cent per pound and that natural gasoline at 3.0 cents per gallons is worth approximately 0.5 cents per pound.

Chemical Utilization of Paraffin Hydrocarbons

In considering the chemical utilization of paraffin hydrocarbons three general types of chemical processes appear to be applicable: namely, pyrolysis, halogenation and oxidation. Commercial applications of each of these processes have been developed to a limited degree, but in no case have their full possibilities been exploited. Large petroleum chemical industries can, and undoubtedly will, be built around these basic processes in the not too distant future.

Pyrolysis

Processes in which high temperatures are used for the purpose of cracking or decomposing the hydrocarbons are referred to as pyrolytic processes. Pyrolysis of the lower hydrocarbons may result in the production of carbon, hydrogen, olefins (unsaturated hydrocarbons) and various liquid products. The latter type of compounds, resulting from the polymerization or condensation of fragments of molecules, often contain aromatic hydrocarbons in appreciable concentrations. The products of pyrolysis may be isolated and marketed as such or they may be used as raw materials for chemical synthesis. For example, the olefins produced in cracking operations may be converted into alcohols by reacting them with sulfuric acid and hydrolyzing the sulfate addition products to obtain the alcohols. Also, butadiene, a product of pyrolysis, is

used in the manufacture of synthetic (Buna) rubbers.

Halogenation

The lower paraffin hydrocarbons may be treated directly with a halogen, preferably chlorine, to produce mono, di, tri, or poly halides. These halogen derivatives may be marketed directly or they may be used as chemical intermediates in the formation of many types of organic chemicals. As an example, carbon tetrachloride, which may be produced by the direct chlorination of methane, is used as a dry-cleaning fluid, an industrial solvent and as a fire extinguisher. This compound may be converted into the refrigerant "Freon" ($C\ Cl_2F_2$) by treatment with antimony trifluoride. The mixed amyl acetates, which have a large use as lacquer solvents, are prepared by chlorinating a mixture of pentanes, hydrolyzing the chlorides to produce the alcohols, and reacting the alcohols with acetic acid to produce the esters.

Oxidation

Under controlled conditions oxygen can be made to react with the paraffin hydrocarbons to produce a large number of oxygenated derivatives which are valuable commercial chemicals. This method of chemical utilization is of particular interest from a commercial standpoint because air can be used as the oxidizing medium. Moreover, oxidation processes can often be carried out at lower temperatures and pressures than are required in many important industrial processes.

The products of oxidation include: alcohols, aldehydes, ketones, acids and esters as well as carbon monoxide and hydrogen. Although it would be impossible to list all of these uses of each of these products, some of their more important uses are discussed briefly. The alcohols are valuable solvents and chemical intermediates. Formaldehye is used in the manufacture of synthetic resins, as will be described later. Acetaldehyde, the only other aldehyde produced in quantity by the oxidation of the lower paraffins, is used in the production of synthetic resins and also in the manufacture of acetic acid. Of the ketones, acetone is believed to be the only one produced in appreciable quantities. This compound has excellent solvent properties and is used as a lacquer solvent and also in the manufacture of smokeless powder. Acetic acid is possibly the most important acid produced by the oxidation of paraffins and this compound is used in large quantities in the manufacture of acetate rayons as well as in the manufacture of acetate solvents. Most of the lower molecular weight acids produced, however, can be used in the manufacture of esters for use as solvents or can be utilized as chemical intermediates. The esters produced directly by oxidation are valuable solvents. Carbon monoxide and hydrogen have been used in large quantities in the production of synthetic methanol.

Some members of C.N.G.A. Technical Committee at 1942 Annual Fall Meeting, November 6th, Biltmore Hotel. Left to right: Glen Hile, Standard Oil Co.; Ed Miller, Union Oil Co.; C. L. Hutchings, Tidewater Associated Oil Co.; A. C. Lyles, K.N.D.A.; J. B. Taylor, Chairman, Signal Oil and Gas Co.; Ed. Valby, Richfield Oil Corp.; W. C. Dayhuff, Standard Oil Co.; R. R. Crippen, Vice-chairman, The Texas Company.

Oxidation of Paraffin Hydrocarbons —Experimental Studies

Our interest lies primarily in the paraffin hydrocarbons, including the normal and iso forms, from methane to octane (C_1 to C_8) for, although other types of hydrocarbons are often present in natural gasoline, the proportion of these latter compounds is usually low. From a theoretical, if not from a practical standpoint, it is possible to isolate, by fractional distillation processes, the lower members of the paraffin series so that it has been possible to investigate the oxidation reactions of individual hydrocarbons. A rather large amount of exploratory work has been carried out by many investigators in connection with the study of the oxidation of the lower paraffins. Although some of this work has been of an academic nature, most of the more recent work has had as its object the finding of conditions which will lead to the production of maximum yields of valuable chemicals, with the view to developing commercially feasible oxidation processes.

Probably the greatest obstacle to the development of oxidation processes applied to methane, or natural gas, has been the difficulty in controlling the reaction to prevent the complete combustion of the hydrocarbons to carbon dioxide and water. It is generally found, particularly with the lower hydrocarbons such as

methane and ethane, that when conditions are imposed which are capable of starting the oxidation reaction, these same conditions are sufficiently severe to carry the reaction to completion. This makes it particularly difficult to isolate the intermediate oxidation products. The difficulty encountered in stopping the oxidation reaction, or series of reactions, at some intermediate point is occasioned by the fact that, in general, the partial oxidation products are more easily oxidized than the parent hydrocarbon.

Methods which have been employed for controlling the oxidation reaction are, briefly: (1) the use of small proportions of oxygen or air, i.e., low oxygen to hydrocarbon ratios, (2) the use of short reaction times followed by immediate quenching of the reaction products, and (3) the use of catalysts to direct the oxidation or to allow the reaction to take place under less severe conditions of temperature and pressure than would be required without catalysts.

A brief summary of some of the more recent experimental work which has been carried out on the lower members of the paraffin hydrocarbon series has been prepared in order to indicate the possibilities which are presented by the development of oxidation processes. No attempt has been made to include oxidation studies made with oxidizing agents other than oxygen or air and very little information is included regarding the use of catalysts. In this latter connection it can be stated that generally most of the reactions discussed in this summary can be carried out at lower temperatures and with somewhat better control by the use of catalysts. Oxidation catalysts which have been used in the experimental work include the nitrogen oxides and metals such as calcium, chromel, silver, aluminum and nickel. An effort has been made where possible to present yield data as well as to list the oxidation products for each hydrocarbon.

Methane

Methane, the simplest hydrocarbon compound, is the main constituent of natural gas. It is the most difficult to oxidize of any of the paraffins and, in this case, the intermediate oxidation products of methane are all far more susceptible to oxidation than methane. For this reason it is particularly difficult to control the oxidation reaction in such a manner that carbon dioxide and water are not the only products.

The simple theoretical reactions which occur between methane. and oxygen are illustrated in Figure 1. It is theoretically possible to produce any one or all of the compounds shown in this figure by exercising proper control of the conditions of oxidation. Padovani and Franchetti[5] found that the reaction to form carbon monoxide and hydrogen (Reaction v) takes place with good yields over a nickel catalyst at temperatures of 1560-2190° F., whereas Wiezevich and Frolich[6] found that methane reacted with air at 930° F. under a pressure of 135 atmospheres (about 2,000 pounds per square inch) to give methanol, formaldehyde and formic acid. At temperatures above about 930° F. the reaction tended to form carbon oxides. Operating at the lower temperature these investigators found that the ratio of production of methanol to formaldehyde was between three and eight parts of the former to one of the latter, indicating that the conditions employed favored reaction (i).

The work of Wiezevich and Frolich was carried out on a sample of methane containing small precentages of ethane. It was pointed out by these authors that in experiments conducted with a sample of methane containing only 0.36 per cent of ethane slightly higher temperatures were required (970° F. or higher) to effect oxidation and most of the oxidation products were carbon oxides and water. However, small amounts of methanol, formaldehyde and formic acid were obtained.

Burke and Fryling[7] oxidized methane with 50 per cent by volume of air at temperatures of 390° to 930° F. and pressure of 200-1750 pounds per square inch without the use of catalysts and they obtained primarily aldehydes and acids. On the other hand Paris[8] found that by oxidizing methane using low oxygen to hydrocarbon ratios under high pres-

C.N.G.A. Fall Meeting Committee, Biltmore Hotel, November 6, 1942. Left to right: John H. Kunkel, The Fluor Corp., Ltd.; R. R. Crippen, The Texas Company; Randal Maass, General Petroleum Corp.; D. E. McFaddin, chairman, Union Oil Co. of Calif.; Ben C. Dumm, Allied Supply Co.; M. W. Kibre, General Petroleum Corp.; J. B. Taylor, Signal Oil & Gas Co.

sures the reaction leading to the formation of methanol was predominant. Although temperature did not appear to be as important as pressure in directing the reaction it was found that maximum yields of methanol were obtained at about 840° F.

It is believed that most of the experimental work carried out with methane has been done with an impure methane containing small percentages of ethane and possibly even propane and for this reason too much importance should not be placed on much of the data obtained. Partial oxidation of pure methane would undoubtedly be more difficult to control than the oxidation of methane containing even small percentages of ethane, and it is believed that further study should be given to reactions of the pure compound.

Ethane

The second member of the paraffin series of hydrocarbons, ethane, is appreciably more easily oxidized than methane, but still less readily attacked by oxygen than the higher members of the series. Ethane is found in natural gas in amounts varying from 0 to about 25 per cent or even higher depending on the source of the gas.

Theoretically, the oxidation of ethane should result in the production of alcohols, aldehydes and acids corresponding to ethane and, because of the tendency for the carbon-to-carbon bond to rupture under the conditions employed for oxidation, particularly in the presence of oxygen, the same series of compounds corresponding to methane should also be expected in the reaction products. In this connection it has been found that the greater part of the partial oxidation products of ethane are ethane derivatives, i.e., they contain two carbon atoms, but appreciable quantities of oxygenated derivatives of methane are also obtained.

Newitt and Townsend[8] found that ethane could be oxidized at 520° F. under 100 atmospheres pressure with the production of rather large proportions of ethanol and methanol and smaller proportions of the corresponding aldehydes and acids. Although data regarding the percentage of ethane oxidized per pass through the reaction zone are not available, recalculation of the yield data presented by these investigators indicates that by completely oxidizing 1,000 cubic feet of ethane gas (about 84.6 pounds) they would be able to produce 103 pounds of liquid products. Data regarding the yields of the various oxidation products of ethane are shown in Table 1.

Figure 1

REACTIONS BETWEEN METHANE AND OXYGEN

i. $CH_4 + O = CH_3OH$	Methanol
ii. $CH_4 + 2\,O = CH_2O + H_2O$	Formaldehyde
iii. $CH_4 + 3\,O = HCO_2H + H_2O$	Formic Acid
iv. $CH_4 + 4\,O = CO_2 + 2H_2O$	Carbon Dioxide
v. $CH_4 + O = CO + 2H_2$	Carbon Monoxide and Hydrogen

Table 1

PRODUCTS OF THE PARTIAL OXIDATION OF ETHANE

(Pressure, 100 atmos.; temperature, 520° F.)

Product	Production per 1,000 Cu. Ft.[a] (84.6 Pounds) Ethane Consumed	
	Weight, Pounds	Volume, Gallons
Ethanol	52.5	8.0
Methanol	28.9	4.3
Acetaldehyde	11.4	1.7
Acetic Acid	9.3	1.1
Formaldehyde	0.3	0.04
Formic Acid	0.6	0.06
Total Useful Products	103.0	15.20

[a]Measured at 32° F. and 29.9 inches of mercury pressure.

Table 2

PRODUCTS OF THE PARTIAL OXIDATION OF PROPANE

(Pressure, 170 atmos.; temperature, 660° F.; conversion per pass, 5.2%)

Product	Production per 1,000 Cu. Ft.[a] (126 Pounds) Propane Consumed	
	Weight, Pounds	Volume, Gallons
Formaldehyde	1.3	0.2
Acetaldehyde	36.7	5.6
Acetone	12.5	1.9
Methanol	40.1	6.0
Ethanol	34.4	5.2
Propanol	29.1	4.3
Butanol	4.8	0.7
Acetic Acid (containing Formic Acid)	11.5	1.3
Total Useful Products	170.4	25.2
Carbon Dioxide	20.7	..
Carbon Monoxide	25.4	..
Water	51.6	6.2

[a]Measured at 32° F. and 29.9 inches of mercury pressure.

Propane

Propane, the third member of the paraffin series, is obtained by topping or stabilizing natural gasoline. This compound, which is more easily oxidized than either ethane or methane, also gives rise to a greater number of oxidation products. Thus, it is theoretically possible to produce alcohols, aldehydes and acids containing one, two and three-carbon atoms, the one and two-carbon atom derivatives resulting from the fission of the carbon-to-carbon bond. Also, a new type of compound is formed in propane oxidation, namely, acetone, the simplest ketone.

Wiezevich and Frolich[6] reported that by oxidizing 98 per cent propane with pure oxygen at 170 atmos-

Group at C.N.G.A. Annual Fall Meeting, Biltmore Hotel, November 6, 1942. Left to right Dr. Hooper Linford, Ph.D., Union Oil Co. of California; L. V. Cassaday, Lomita Gasoline Co.; W. A. Kirk, California Southern Oil Co.; Alexander Macdonald, War Production Board, R. W. Heath, Signal Oil & Gas Co.; Earle Derby, Standard Oil Co. of California; P. S. Magruder, General Petroleum Corp.; W. W. Robinson, Jr.

pheres pressure and 660° F., without the use of a catalyst, they were able to convert approximately 5.2 per cent of the feed per pass into oxygenated derivatives. Data presented by these investigators have been recalculated to show the yields of the various products per 1,000 cubic feet (about 126 pounds) of propane oxidized. These data are shown in Table 2.

These investigators found that the yields of acids could be increased, at the expense of the alcohols and aldehydes, by extracting the acids from the oxidation products and recycling the intermediate oxidation products along with the propane and fresh quantities of oxygen. As might be expected the proportion of propane being oxidized to carbon dioxide and water also increased in this method of operation.

Butane

Oxidation of the butanes (normal and iso-), which are present in rather large proportions in natural gasoline, results in the production of a considerable number of oxygenated derivatives. Wiezevich and Frolich[6] report that a sample of 95 per cent butane oxidized readily at temperatures of 410-490° F., and pressures of 33-160 atmospheres. They were able to identify alcohols containing one, two, three and four-carbon atoms, acetaldehyde, propionaldehyde, acetone, acetic acid, and propyl acetate. The latter compound is an ester resulting from the reaction between acetic acid and propanol. These investigators found that in general the lower pressures favored the formation of low molecular weight alcohols and acids, whereas the higher pressures favored the formation of higher molecular weight alcohols and aldehydes.

Bludworth[10] believes that the oxidation of butane can be controlled by a method involving many recyclings of reactants using only very small amounts of oxygen. He indicates that he is able to produce eight gallons of liquid oxidation products from 1,000 cubic feet of butane gas by recycling 15 or 16 times. The product was found to consist of approximately 75 per cent methanol, 12.5 per cent acetone and 12.5 per cent acetaldehyde.

Pentane

The products of the partial oxidation of pentanes are complex mixtures and are not readily separated into individual components. Thus, Wiezevich and Frolich[6] oxidized a mixture of pentanes consisting of 60 per cent normal and 40 per cent isopentane at 465° F. and 200 atmospheres pressure and obtained a series of alcohols ranging from methanol to the pentanols (containing five carbon atoms) together with acetaldehyde, acetone, and formic and acetic acids. It is interesting that the products were mainly in the two and three-carbon atom range indicating that the pentane molecule was broken between the second and third-carbon atoms.

In a small plant operating with a flow rate of 2.0 gallons per minute it was found that the total liquid oxidation products amounted to 87.5 gallons per day. This plant was operated with recycling of the pentane and a pentane balance indicated that 1.7 gallons of pentane were consumed for each gallon of liquid products. Calculations have been made to show the yields of the various oxidation products for each 100 pounds (19.2 gallons) of pentane consumed and these data are presented in Table 3.

It was found that the yields of acids could be increased by extracting the acids from the reaction products and recycling the intermediate oxidation products along with the unoxidized pentane. With this method of operation the ratio of production of formic acid to acetic acid was greatly increased. This ratio was about 1 to 11.5 when operating without recycling of the alcohols and aldehydes and when these materials were recycled the ratio was 1 to 2.7.

Hexane

There is little information available in the literature concerning the partial oxidation of hexane. Some work carried out by Wheeler and Blair[11] indicated that the slow oxidation of hexane gives higher aldehydes, unsaturates (mostly ethylene), carbon oxides and water. Increased temperatures tend to reduce the yields of aldehydes and increase the production of acetic acid. It is

Table 3

PRODUCTS OF THE PARTIAL OXIDATION OF PENTANE

(Pressure, 200 atmos.; temperature, 465° F.)

Product	Production per 100 Pounds (19.2 Gallons) Pentane Consumed	
	Weight, Pounds	Volume, Gallons
Acetaldehyde	5.3	0.8
Methyl Acetone[a]	12.2	1.8
Alcohol (boiling up to 230° F.)[b]	26.8	4.0
Alcohols (boiling 230-266° F.)[c]	8.7	1.3
Acetic Acid	27.0	3.1
Formic Acid	2.8	0.3
Total Useful Products	82.8	11.3

[a]Mixture of methanol and acetone containing about 15 per cent of the former.
[b]Believed to contain ethanol, n- and isopropanols, and small amounts of tert-pentanol.
[c]Mainly secondary pentanol with small amounts of tert-pentanol.

Table 4

YIELDS OF LOW MOLECULAR WEIGHT FATTY ACIDS PRODUCED BY THE LIQUID PHASE OXIDATION OF C_7 TO C_9 HYDROCARBONS

(Pressure, 7 atmos.; temperature, 300-340° F.)

Acid	Production per 100 Pounds (15.9 Gallons) of Charge Consumed	
	Weight, Pounds	Volume, Gallons
Formic	9.0	0.88
Acetic	18.0	2.06
Propionic	4.5	0.54
Butyric	2.0	0.25

believed that the proportions of oxygen in the reacting mixture were higher than would be desirable for the production of high yields of alcohols and aldehydes. The high oxygen concentration may also have accounted for the rather large amounts of unsaturated hydrocarbons present in the reaction products.

Heptane

A mixture of the heptane isomers, obtained from casinghead gasoline, boiling between 158-207°F. was oxidized by Weizevich and Frolich[6]. The reaction was carried out at temperatures between 356-437°F. and at pressures of 135 atmospheres. Under these conditions the heptane fraction would remain in a liquid condition so that this is truly a liquid phase rather than a vapor phase oxidation. The products were primarily alcohols in the hexyl-heptyl (C_6-C_7) range, but there were produced smaller amounts of the alcohols, aldehydes, ketones and acids.

Mixture of Heptanes, Octanes and Nonanes

Liquid phase oxidation of a petroleum fraction boiling in the range of 235-290°F. and consisting primarily of hydrocarbons containing seven, eight and nine-carbon atoms per molecule, has been found to produce rather high yields of acids.[12] The stock was prepared by extracting straight-run gasoline with liquid sulfur dioxide and fractionating the portion insoluble in the sulfur dioxide (raffinate) to obtain a material of the desired boiling range. This material was found to contain approximately 51 per cent paraffin, 47 per cent naphthene and 2 per cent aromatic hydrocarbons so that the results obtained in this work are not directly comparable to those obtained with pure paraffin hydrocarbons. It is believed, however, that they might indicate the probable course of the oxidation reaction applied to a similar fraction of natural gasoline, particularly one containing naphthene hydrocarbons.

Briefly, the method of carrying out this type of liquid phase oxidation is to place the fraction to be oxidized in a reaction vessel where it is blown with air at elevated temperatures. The particular fraction referred to above was oxidized at temperatures of 300-340°F. under pressures of 100 pounds per square inch. Under these conditions oxidation took place readily without the use of a catalyst.

The main products of reaction were acids although appreciable quantities of alcohols, aldehydes, ketones and esters were found in the reaction products. Water and carbon dioxide were always formed during the oxidation and resulted from the complete combustion of fragments of hydrocarbon molecules. It was found possible to separate the lower molecular weight fatty acids, in a relatively pure form, from the other products of reaction and the yields of these acids, per 100 pounds (15.9 gallons) of the hydrocarbon fraction oxidized, have been calculated. These yield data are shown in Table 4.

A mixture of low molecular weight alcohols, aldehydes, ketones and esters which was readily separated from the oxidation products amounted to over 15 per cent by weight of the hydrocarbon charge. A mixture of high molecular weight acids and esters, obtained as a residue from the oxidation vessel, amounted to about 38 per cent of the oxidation charge.

This fraction has been found to contain dibasic acids, and, in fact, appreciable quantities of pure succinic acid ($C_2H_4(COOH)_2$) have been separated from this mixture of acids by ordinary physical means.

The results of this work are of particular interest in that they show the poscibility of converting a low-grade gasoline fraction into chemical products by means of a low-temperature, relatively low-pressure, oxidation process using air as the oxidizing medium.

Oxidation of Natural Gas

In the commercial utilization of oxidation as a means of producing chemicals from petroleum hydrocarbons it is probably advantageous to consider the use of mixtures of hydrocarbons rather than pure compounds due to the increased raw materials cost if separation of pure compounds were required. Narrow boiling range fractions are easily and cheaply produced in ordinary petro-

leum refinery equipment, and it is these fractions that are the most likely to be used in commercial oxidation processes. Dry or lean natural gas is an example of a fraction of petroleum that can be used without further processing. This material, as has already been pointed out, contains large proportions of methane but in addition contains ethane and propane and is a material which lends itself well to chemical processing because of its huge supply and low cost.

Commercial Oxidation of Natural Gas

The first successful commercial plant utilizing natural gas as a raw material for the production of chemicals by oxidation is believed to be that of the Cities Service Oil Company at Tallant, Oklahoma. At this plant large quantities of methanol and formaldehyde are being produced, along with smaller amounts of other chemicals, by the controlled oxidation of natural gas. It has been estimated that this and possibly some other similar plants were producing between one-fourth and one-third of the total supply of methanol and formaldehyde in the United States in 1941.[13]

The development of the oxidation process by Cities Service Oil Company in the early part of 1928 was reported to have been the result of an investigation of a new treating procedure for ntaural gas designed to reduce pipeline corrosion. The corrosion was believed to have been due to the presence of small amounts of oxygen in the natural gas and in order to eliminate this oxygen additional quantities of oxygen (air) were added and the gas subjected to pressure and high temperatures in order to initiate oxidation and thus remove all of the oxygen. The oxidation products were condensed from the treated gas and found to contain methanol, formaldehyde, acetaldehyde and acetone.

The plant operations have been described briefly and a flow diagram for the operation appeared recently in the literature.[14] The operations are relatively simple and consist in compressing a mixture of natural gas and air and passing the mixture through a reaction zone at elevated temperatures. The reaction mixture is cooled on leaving the reactor and the liquid products are condensed and separated from the unoxidized gas. A portion of the gas stream from the separator is recycled, mixed with fresh feed and air, and further oxidized. The conditions of operation are not disclosed, and it is not known whether catalysts are used, but it is believed that the process is catalytic. It is stated that the temperatures and pressures are low as comparel with the temperatures and pressures required in many high pressure syntheses. Presumably, equipment costs for such installations would not be excessive. In this connection it is believed that ordinary steel equipment is all that is required since the proportion of acids in the products is very low.

Methanol and formaldehyde are the main products of this plant and these compounds are produced in approximately equal proportions. In addition to these two compounds there is produced an appreciable quantity of acetaldehyde and smaller amounts of acetone. In separating the reaction products, an initial rough separation is made and these impure products are refractionated to produce the materials of commercial quality. Methanol and acetaldehyde are separated as pure compounds, formalhehyde is produced as a 40 per cent solution in water (formalin), and acetone, which is difficult to separate from mixtures containing methanol ,is produced as so-called methyl acetone. This latter product is a mixture of methanol and acetone containing approximately 15 per cent of the former and is a valuable commercial solvent.

Group at C.N.G.A. Fall Meeting, Biltmore Hotel, Los Angeles, November 6, 1942. Left to right:..A. J. L. Hutchinson, M. A. Ellsworth, W. E. Dunn, J. S. Fluor, Jr., P. E. Fluor, H. R. Lamberth, John H. Kunkel, all of the Fluor Corp., Ltd.

Market for Methanol and Formaldehyde

When Cities Service Oil Company first started producing methanol and formaldehyde there was an abundant supply of both of these products. Methanol was being produced by a high-pressure catalytic process from carbon monoxide and hydrogen, and formaldehyde was being produced by the catalytic oxidation of methanol. Although at first the production of these two commodities from natural gas did not appear to be justified on the basis of market condi-

tions there shortly arose a new, large utilization for the formaldehyde, and indirectly the methanol: its use in the sythetic resin industry. This new and fast growing industry was able to use all of the formaldehyde available.

The large consumption of formaldehyde by the synthetic resin industry is easily understood when it is realized that formaldehyde is used in the production of about one-half of the molded plastics manufactured in the United States. These plastics include the phenol- and cresol-formaldehyde plastics, such as Bakelite; the urea-formaldehyde plastics, such as Beetle and Plaskon; and the casein plastics, such as Ameroid. Due to the present large use of plastics in war production, there is a shortage of both formaldehyde and methanol. Formaldehyde was one of the first chemicals to be placed on a mandatory priority basis; this control being instituted in August, 1941.

The shortage of both of these chemicals has been due in part to the conversion of the large du Pont methanol plant at Bellie, West Virginia, into an ammonia plant as a war production measure. The reason for this conversion is apparent when it is realized that both the synthetic methanol process and the ammonia process require high pressure equipment that is difficult to build with the present demands on steel. It appears, therefore, that much of the formaldehyde produced to meet the war emergency will be produced at plants similar to the one at Tallant, Oklahoma, and it is presumed that more of these plants are being, or will be constructed in the near future. It has been predicted that even though more natural gas oxidation plants are built to meet the war demands the natural gas process will be able to maintain its position after the war.[13] This prediction is based on the belief that the plastics industry is destined to even further expansion and to the belief that the high pressure catalytic methanol processes may find it difficult to compete with the cheaper natural gas process.

Future Developments

The petroleum industry has seemingly been slow to realize and to capitalize upon the fact that their basic raw materials, crude oil and natural gas can be profitably converted into chemical products. This reluctance to enter the chemical field can be traced to several fundamental factors:

1. The industry has been so engrossed in producing huge quantities of crude oil and refining this material at a profit that consideration of chemical outlets, which at best would utilize relatively small amounts of petroleum, has not seemed desirable.

2. The cost of plants required for chemical production are, in general, far greater than the usual refinery construction costs.

3. The rapidly changing character of the chemical market makes it imperative that a manufacturer be ready to convert his plants and processes to meet the changing conditions. Thus, chemicals that today are novelties and of little commercial value, may tomorrow be required in large quantities, and others, which today are being used in large amounts, may be displaced tomorrow by better or cheaper substitutes.

The petroleum chemical industry has a sound basic position because of its control of the cheapest source of hydrocarbon raw material and its future development will depend upon the ability of the personnel of this industry to improve upon present known methods and develop new methods for chemical processing.

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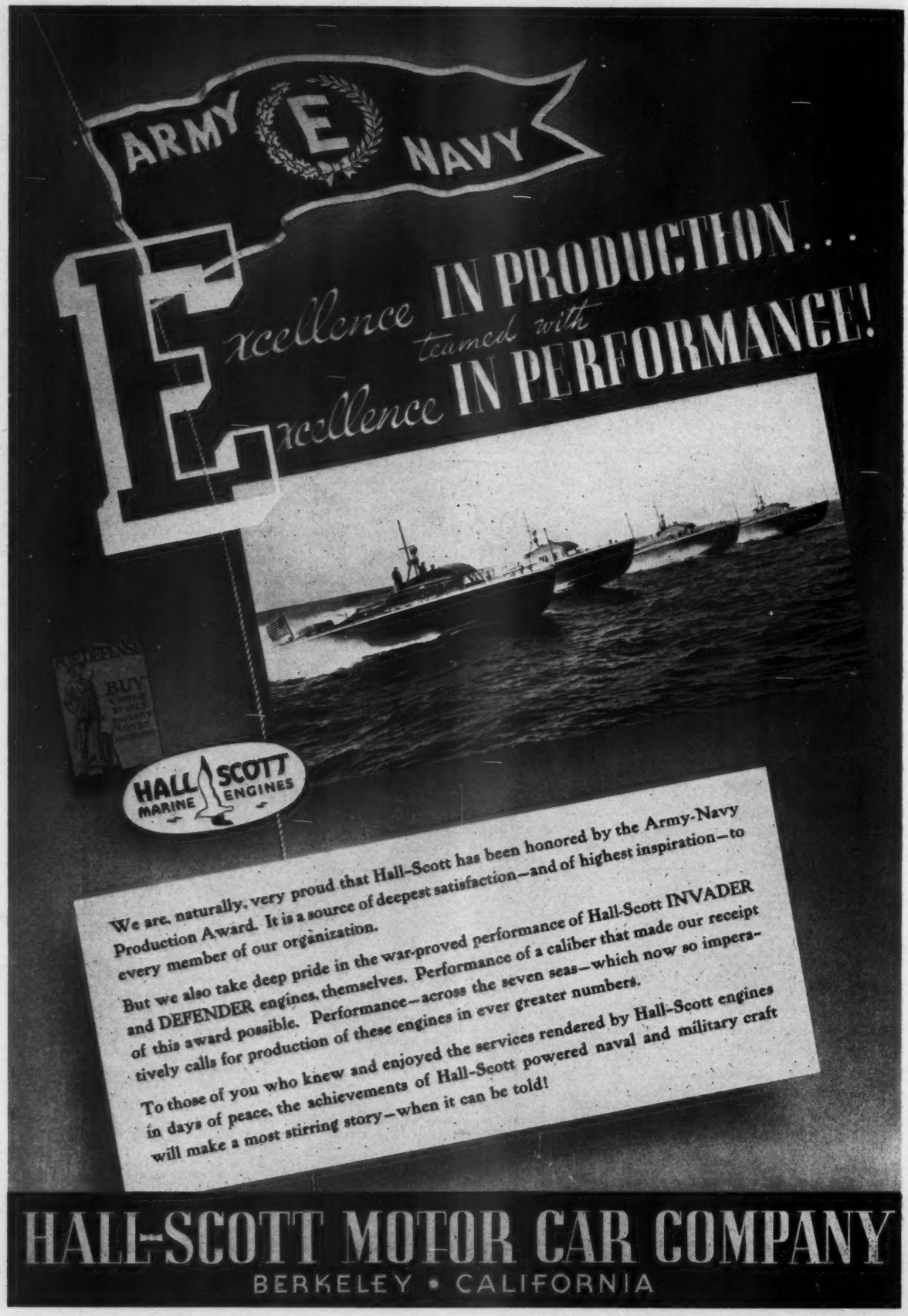
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THIS LAUGH

OFF!!

A man in St. Louis was hailed into court for driving his wife into the streets nude. When the judge demanded an explanation, he replied wearily:

"I just wanted to find out if it made any difference," he explained. "Day after day she kept complaining about not having a thing to wear!"

First Soldier: "Where'd you get that black eye?"

Second Soldier: "You know that tiny, frail-looking creature I had a date with last night?"

First Soldier: "Yes, but—"

Second Soldier: "How was I to know she was the champion riveter at the shipyards?"

A young lady who tried to enlist in the WAACS was told by the recruiting officer to go home and put on more weight.

"Okay," she answered. "But if it comes out in the wrong places and my boy friend quits me—I'll sue the government for alienation of affections!"

A fussy, overbearing lady entered a crowded streetcar and began fuming noisily over being compelled to stand. After edging everyone about for a time, a young man tapped her on the shoulder and asked, "Madam, you are standing on my foot. Would you mind getting off?"

Bristling, she retorted, "Why don't you put your foot where it belongs?"

"Don't tempt me, Madam, don't tempt me!" he countered.

He: "Since I met you, I can't eat, I can't sleep, I can't drink."

She (coyly): "Why not?"

He: "I'm broke!"

The sergeant strode into the squadroom. "All you !*x!*x! lazy apes fall out!" he exclaimed. The soldiers grabbed their hats and swarmed out . . . all but one who continued to lie on his bunk blowing smoke rings.

"Well?" roared the sarge.

"Well," remarked the rook, "there were a lot of them, weren't there?"

"Pappy, ain't you gonna shoot that city slicker who didn't do right by me yistiddy?"

"Sure, datter—but don't be so tarnation hurrified—fust give me a chanct to shoot the one who didn't do right by you the day before yistiddy."

"Do you believe in clubs for women?"

"Yes, if kindness fails."

"Help! I can't swim! Drop me a line!"

"Sure, and you can write to me once in a while, too."

"Well, I certainly made a good impression on her," said the cane-bottomed chair as the artist's model stood up.

"I paid $100 for that dog—part collie and part bull."

"What part is bull?"

"The part about the $100."

Mr. Green: "My wife is scared to death that someone will steal her clothes."

Mr. Jones: "Doesn't she have them insured?"

Mr. Green: "She has a better idea. She has some guy stay in the closet and watch them. I found him there last night."

He: "Gosh, it's dark in this parlor. I can't even see my hand in front of me."

She: "That's all right. I know where it is."

JOB WANTED!

I am a JENSEN JACK. My business is production. I work at it around the world, and the tougher the job the better I like it. At a time like this when good help is hard to get, you'll probably appreciate my dependability. I never quit or complain when the going is rough. I demand no special consideration because we happen to be at war, and I do my work for less money than it can be accomplished any other way.

In the picture I am handling a 3500' well for the Cleveland Oil Co., Wilmington, Calif. ¾" rods. 1¾" pump. Sixteen 48" S. P. M. U-4 International Gas Engine.

If you need my kind of help, I am available anywhere, any time.

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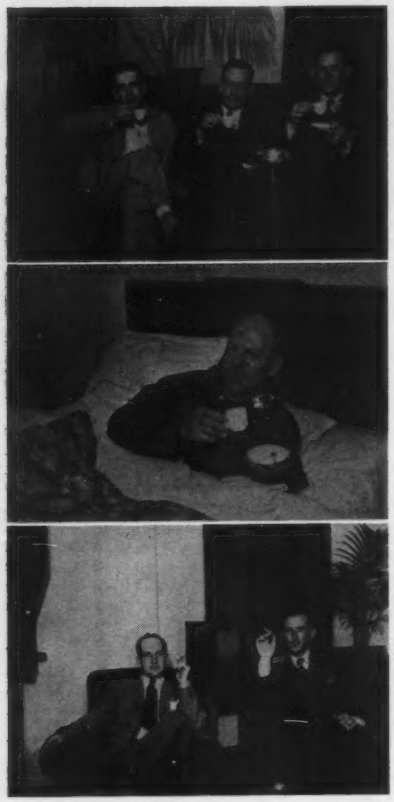
"Big-Rig" Operators Enjoy New Zealand

The accompanying photos of Superior Oil Co. workers in Palmerston North, New Zealand, are direct evidence that petroleum pioneers in the lands "down under" endure no hardships.

The pictures were obtained through the kindness of Mrs. C. L. Corley of Bakersfield, wife of the gentleman on the left in the upper photo. Mrs. Corley identifies them



as: C. L. Corley, drilling foreman; Ray DuRoy, drilling foreman, and Jack Taylor, driller. Mrs. Corley says in part: "Look closely behind Mr. Corley's right ear and you'll see a young lady. Mr. Corley looks so pleased with himself I'm sure he thought he had her hidden."

The center "pic" is T. T. Vaughan, general superintendent, who is experiencing the usual matutinal cup-o'-tea. Mrs. Corley, who has a delicious sense of humor, says: "The big joke about Mr. Vaughn's picture is the idea of being awakened with tea. Note the 10-gallon hat on the dresser."

The two enjoying their ease in the lower picture are: left, Lester F. Maupin and Jack Taylor, drillers.

We hope the military censor lets these photos through to our New Zealand subscribers for Mrs. Corley says: "If T. T. ever gets his copy of the (California) Oil World the fun will be wasted, for he might not show them."

(Mr. Censor, please go easy—for, as our charming correspondent says, in times like these, "anything for a laugh.")

Emsco Announces Appointment of William T. Powell

Emsco Derrick & Equipment Company announces the appointment of William T. Powell as a vice president of that Company effective October 1, 1942. Mr. Powell was born in Treorchy, Wales on December 22, 1901. He is a mechanical engineer; was graduated from the South Wales and Monmouthshire School of Mines in 1923, holds a mechanical engineering certificate of City and Guilds of London Institute, and is a member of the American Society of Mechanical Engineers.

Prior to 1929, when Mr. Powell came to the United States, he was associated with the Bedwas Navigation Colliery Company as Assistant Chief Engineer of that Company's Bedwas mine.

He became a citizen of the United States in 1935 and, since taking up residence in this country, he has been associated successively with the C & A Mining Company, Ajo, Arizona; the Dicalite Company, Torrance, California; the Kelco Co., San Diego, California and the American Potash & Chemical Corporation at Trona, California.

Mr. Powell entered the Emsco organization on August 1, 1937 in the fabricated Plate Division. Since the beginning of the present emergency he has devoted his entire time to Emsco's effort in the production of war materials. He has been manager of the War Materials Division since that division was organized in June, 1941. Mr. Powell is well known in procurement circles of the Army, Navy, Aircraft and other major war material manufacturers. He will continue to carry a major part of the responsibility which Emsco has assumed in its contribution to the war effort.

WILLIAM T. POWELL

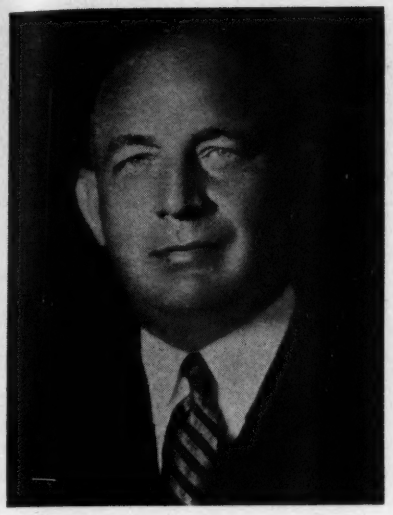
Montrose Completes Eastern Trip

M. E. Montrose, vice president of Lane-Wells Company, has just returned from a seven-weeks' trip through the Mid-Continent and Gulf Coast areas and also through the East where he visited plants of some of the nation's leading machine tool manufacturers.

Lane-Wells operations during the past year have been expanded to include the manufacture of specialized machine tool accessories for the metal working and oil tool industries.

George Clifford Elected Vice-President of National

George E. Clifford was elected a Vice President of The National Supply Company, Pittsburgh, Pa., effective as of October 19, 1942. Mr. Clifford will supervise the sales of certain munitions, in addition to his present responsibilities as Vice President in charge of sales for Spang Chalfant, Inc.



L. H. Keim

Oil Well Supply Company announces the transfer of Mr. L. H. Keim, vice-president in charge of its West Coast operations, to the company's manufacturing headquarters at Oil City, Pa.

The increased war production activities in Oilwell's plants require the addition of executive personnel for the duration, and Mr. Keim's background and experience in manufacturing and field service will be particularly valuable to the company's plant operations in the present war effort.

Mr. Keim is a native of Pittsburgh, Pa., where he received his technical and practical training.

In 1912 he became affiliated with the Westinghouse interests with various assignments, including that of mechanical engineer. During the first World War, Mr. Keim assisted in designing and producing tanks and heavy ordnance and, after the Armistice, was appointed general sales manager of the Nuttall Division.

Nuttall and Oilwell collaborated in the design and development of special drilling equipment, after which Mr. Keim joined the Oilwell organization and was transferred to California. He was appointed general manager in charge of sales and manufacturing operations, and, since 1929, has served as vice-president.

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Shown in the background is a Model 6-WAKU *Multi-Fuel* Waukesha Power Unit, 6¼" x 6½", 1197 cu. in.—the prime mover on the draw works.

In the right foreground are two Model 145-GKU Waukesha *Multi-Fuel* Power Units, 5¼" x 6", 779 cu. in.—operating the Gardner-Denver mud pumps.

In the left foreground is a Model XAHU Waukesha Power Unit, 3⅝" x 4½", 186 cu. in.—powering a 10 KW generator which supplies light and auxiliary power for the rig.

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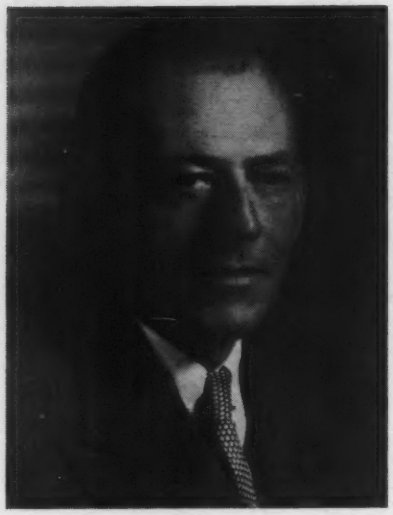


Harold W. Fletcher

Harold W. Fletcher, 51, vice-president and general manager of Hughes Tool Company, Houston, Texas, died on October 15. Mr. Fletcher was born in Brooklyn, N. Y., and received his college education at Cornell University, from which he was graduated with honors in engineering in 1915. He began his connection with the Hughes Tool Company as an engineer in 1916. In 1918 he was promoted to chief engineer, a position he held until his promotion to vice-president and general manager three years ago. During his years with the company he developed a number of inventions, chiefly concerned with the oil industry. He was a member of the American Society of Mechanical Engineers, the American Institute of Mining and Metallurgical Engineers, the American Petroleum Institute, and of Sigma Xi Fraternity. Surviving Mr. Fletcher are his widow, a daughter and two sons.

Nomads October Meeting

The first fall meeting of the Los Angeles Chapter of Nomads held at the Clark Hotel October 21, 1942, was in honor of the charter members. After calling the roll of the charter members and having each present rise, short talks were given by the three past presidents of the organization. Elmer Decker, the first president of the chapter, spoke first and was followed by Ted Sutter, the second president and Ernie Fowks, the third president. Bill Bettis, the present and fourth president, then introduced the speaker of the evening, Dick Atkinson.

Mr. Atkinson spoke on Russia, and, after giving a background of developments in that country since the First World War, stated that he felt confident of the ability of Russia to withstand the German attack. He based his remarks on his familiarity with Russia and the Russian people and was well qualified to speak on the progress Russia has made and of the future outlook for that country. Mr. Atkinson first went to Russia during the previous war and was in close contact with both the fighting forces and the powers that were. He was there during the revolutional periods and secured first-hand knowledge of Lenin, Trotsky and Stalin.

Since that hectic time of his first visit, Mr. Atkinson has made several more trips to Russia. During the period elapsing between the previous war and the present conflict he has become impressed with the advancement of the people in education, medicine, engineering and the arts. He firmly believes that the Russian people have a sincere feeling of friendship for America and admire particularly our industrial development.

Among oil men from foreign fields present at the meeting were Karl Jauman, formerly with the Antilles Petroleum Company in Trinidad; E. B. Udlock of the Standard Oil Company of Venezuela; D. W. Patton of the Colombian Petroleum Company; Alfonso Chiriboga who is with the department of mines and oil of the Ecuadorian Government; William Porter, a consulting geologist who spent some time in the Philippines before the present war; and R. H. Larson of Balfour, Guthrie & Company whose foreign interests are well known.

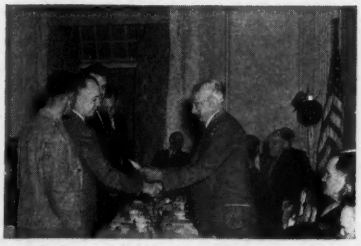
Engineering, Technology, latest news—twice a month in California Oil World.

Employees of Tide Warter Associated Oil Company's Southern California Pipe Line Department received coveted United States Treasury Certificate of Merit and "T" Pennant in foreground, left to right: Earl Gillfillan, Supervisor of Pipe Lines; D. D. Stark, Superintendent of Watson Refinery; Frank E. Coyle, Superintendent of Southern California Pipe Lines, and Vaugh Boyington, representing the Southern California Administrator's Department of War Bonds and Savings Stamp Office Portion of group in background of employees participating in War Bond Drive.

Baker Awards Service Pins

The California Division of Baker Oil Tools, Inc., presented Service Pins to its employees in recognition of five, ten, fifteen and twenty years of service, at a banquet held in the Wedgewood Room of Carl's Viewpark Restaurant in Los Angeles, the evening of October 3rd. Mr. T. Sutter, Executive Vice President and General Manager, acted as Master of Ceremonies.

One hundred and seventy-five employees were in attendance. An even hundred Service Pins were awarded, including a special platinum and diamond Founder's Pin presented in turn to Mr. R. C. Baker by the employees.



R. C. Baker, Sr., presenting ten-year pin to R. W. Beals.

Mr. Baker, President and Founder of Baker Oil Tools, Inc., is considered one of the oil equipment industry's outstanding pioneers and inventors. His colorful history covers a span of fifty years, going back to 1893 when he first came to Los Angeles as a contractor-producer. In 1913 he founded the Baker Casing Shoe Company at Coalinga, California. Shortly thereafter the present corporation was formed, and in 1922 the company moved its headquarters to Los Angeles. Today manufacturing plants and offices are maintained at Los Angeles, Coalinga and Houston, with branch offices and representatives located throughout the important oil producing territories of the United States and South America.

Many of the fifty-two former Baker employees, now in the Armed Forces, also earned Service Pins which the company is holding for them until they return from their fighting job with Uncle Sam.

Honored guests for the evening included Captain George Serfass and Captain Joseph W. Campbell of the U. S. Army Ordnance Department. Both officers made interesting and constructive addresses concerning our country's war production and the part that Baker Oil Tools, Inc., is playing in that connection.

A similar banquet and presentation ceremony will be held in the near future at the Company's Central Division headquarters in Houston. Service Pin awards will be made to employees there by Mr. C. E. Whitney, Vice President and Manager of Baker's Division operations.

Huff Resigns; Returns to California

William F. Huff, special consultant to the Deputy Petroleum Coordinator for War, has resigned to return to private business in California, Deputy Petroleum Coordinator Ralph K. Davies announced on Nov. 3rd.

Well-known in the oil industry as a materials expert, Mr. Huff joined OPC in January, 1942, when he was appointed director of the then newly created Division of Materials.

In July, Mr. Huff was relieved of administrative duties to devote his entire time to the preparation of a petroleum industry materials inventory program.

"With my work now completed, I feel that a return to my private business activities will permit me to be of greater service to the war program," Mr. Huff wrote in his letter of resignation. "Please consider me as being at your disposal for any future consultation which you may deem desirable."

Accepting the resignation, Mr. Davies in part said:

"While I am sympathetic with the motives which actuate your return to private business in California, where I know you will continue to contribute materially to the war program, I naturally regret that we are

Wm. F. Huff

no longer to have the benefit of your services here.

"Your efforts in connection with (your) important assignments have been decidedly helpful and represent a contribution to the war program in which you may well take pride."

Mr. Huff, a native of Texas, had started a career in public utilities, with the Pacific Telephone and Telegraph Company, when World War I interrupted this work. Enlisting as a private, he served in the Army for eighteen months, winning promotion to the rank of second lieutenant. After the war, he served in various capacities in the production of petroleum and in 1921, he went to the National Supply Company, serving as assistant sales manager and as western export sales manager. He left that company in 1935 to become vice-president and secretary-treasurer of the Bettis Rubber Company. In 1938, he went to the Petroleum Equipment Company as manager of tubular sales, remaining with that firm until coming to the Coordinator's Office.

His home is in Glendale, California.

Engineering, Technology, latest news—twice a month in California Oil World.

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This year, on Associated's 17th consecutive year of football sportcasting, you're invited to enjoy another friendly Associated service...a football radio log. This handy booklet shows the broadcast time of all the football sportcasts as well as the different radio stations releasing the games. It's FREE to you, now, at all Smiling Associated Dealers'.

TIDE WATER **ASSOCIATED** OIL COMPANY

Field Development

Los Angeles Basin

Newhall-Potrero Tips Prove Productive

Wells were completed recently at opposite extreme tips of the Newhall-Potrero field extending the field to th enorth and confirming a southerly extension.

At the northerly field tip The Texas Co. finished Newhall No. 1, in sec. 22,4n-17w, from plugged depth of 7901 ft. flowing clean 30.5 gravity oil at a 375 bbl. rate and 300,000 cu. ft. of gas thru a 40/64 in. bean. Settled production is 190 bbls. thru a 24/64 in. bean. This completion, while lower structurally than expected, extends the field area some 1800 ft. to the northwest.

At the southerly flank of the field, near the center of sec. 36,4n-17w, Barnsdall Oil Co. Rancho San Francisco No. 32 again demonstrated the productivity of the sands which C. G. Willis opened last year. Bottomed in gray sand at 7416 ft. the well plugged back to 7015 ft. and landed liner perforated in the intervals 6752-6859' & 6934-7013' to complete flowing 357 bbls. of clean 33.3 gravity oil and 240,000 cu. ft. of gas thru a 26/64 in. bean. The sands were found approximately 90 ft. higher than in the Willis extension discovery some 800 ft. to the southeast.

Standard Finishes Montebello Pumper

The second producer in Standard Oil Co.'s current program of Montebello development was turned to the tanks on the 2nd instant. The well, No. 93, bottomed at 2900 ft. to yield 113 bbls. of 17.1 gravity oil cutting 28.4%. No. 94 is coring for the oil zone at the 2500 ft. level.

Conoco Redrills Turnbull Cyn. Well

Continental Oil Co. is redrilling Community No. 4 on sec. 13,2s-11w in the Turnbull Canyon field after bottoming in hard shale at 2527 ft. A whipstock was set on a plug at 2290 ft. and the well was last reported directionally redrilling in conglomerate at 2554 ft.

In the nearby Puente Hills area Commonwealth Oil Co. Billy Rowland No. 1 has been acquired by Barry Oil Co. which plans to run casing and test the 2110 ft. hole.

Wood-Callahan Comps. Redondo-Torrance Well

Wood-Callahan Oil Co. finished its Redondo-Torrance well, Dominguez Estates No. 3 at 3675 ft. pumping an average 70 bbls. of clean 14.5 gravity oil and is reported contemplating an immediate successor. Also planning to drill in the area is J. E. Pettijohn and Royal Pet. Company.

Engineering, Technology, latest news—twice a month in California Oil World.

LOS ANGELES BASIN WILDCATS

Area	Well	No.	Section	Depth	Status
Castaic	The Texas Co., Towle	1	3, 4-17	7218	Abandoned
	Young, Roy W., Inc., Walker	1	11, 5-16	9981	Idle
Del Valle	Union Oil Co. N. L. & F.	1	20,4-17	5765	Drilling
Las Llajas	West'n. Gulf Oil Co., Brady	1	13, 3-17	2739	Drilling
Newhall	Aztec Oil Co., Sanborn	1	6, 3-16	6500	Drilling
	James C. Brazell, Trustee, Perkins	1	11,3-16	4473	Pumping
	So. Calif. Pet. Corp., Lassalle	44-1	3, 3-16		Location
Puente	Shell Oil Co. Inc., Garnier	1	33,1-10	4591	Abandoned
Puente Hills	Commonwealth Oil Co., Roland	1	14, 2-10	2110	Idle
	Melvin Hansen, Dragna	1	24, 2-10	2644	Reaming
Rio Hondo	Potrero Oil Co., Newman	1	32, 1-11	5497	Idle
San Fernando	Tide Water Assoc., Sesnon	1	28, 3-16	8912	Redrilling
Whittier-La Habra	Los Nietos Valley Oil Co., Woodward	1	29, 2-11	3187	Drilling
	Orange County				
Buena Park	The Texas Co., Buena Park 4F	1	36, 3-11	9871	Drilling
Stanton	J. E. F. Oil Co., Well	1	23, 4-11		Material
	Riverside County				
San Jacinto	Wonder Oil Co., Stroh	1	30,4-1	1304	Drilling
	San Bernardino County				
Carbon Canyon	Stella, E. F., McDermott	2	5, 3-8	879	Drilling
	Municipal Oil Co., Mahala	1	13,3-8	4217	Reaming

St. Anthony Plans Rosecrans Deepening

St. Anthony Oil Corp. will soon start a redrill and deepening job on its 8031 ft. Gordon No. 8, north of Redondo Beach Blvd. and west of Broadway, at the west flank of the Rosecrans field.. Pike Drilling Co. will do the work under contract.

Yorba Linda Jobs Yet Continuing

Shell Oil Co. Inc. is going ahead with development of fee owned acreage at Yorba Linda. Currently finishing is No. 78-16 which bottomed in gray sand and silt at 2218 ft., plugged to 2150 ft. and ran liner perforated in the intervals 2145-1920 & 1860-1720 ft. Olinda Fee No. 4-7-15 is standing cemented after landing 11¾ in. casing at 110 ft. while sites for 35-16 and 57-16 have been staked.

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Wilmington Work Hits Slow Pace

Work in the Wilmington-Long Beach Harbor area is at low ebb when compared to the activity in the pre-M-68 days. Many exceptions are pending but in the townsite area operators are finding it difficult to qualify on the acreage standard assigned the field.

On Terminal Island Long Beach Oil Development continues its whipstocking development of the "W" parcel with No. 39 turned to the tanks making 265 bbls. of clean 16.2 gravity oil, No. 35 reaming at 3940 ft., No. 40 fishing liner to blank off sands proved wet below the "F" shale, No. 33 rigging up and No. 41 standing with 8⅝ in. casing cemented after reaching 2843 ft.

On the mainland General Pet. Corp. is redrilling Terminal No. 5 at 3100 ft. after setting a whipstock at 2633 ft. in the original 3600 ft. hole. Nearby Union Pacific Railroad is redrilling Offset No. 24 at 2885 ft. after milling thru casing at 2745 ft.

In the townlot area Royalty Service Corp. is completing Nelson No. A-5 after redrilling and will soon start a redrill on Santa Fe No. B-2 which will convert the hole from a Ford zone to a Terminal zone project.

At the north flank of Wilmington The Texas Co. continues development of its fee owned refinery site on a 1 well to 10 acre basis. The company is rigging up No. 6 after completing job 5 at 3505 ft. pumping an average 50 bbls. daily.

Also preparing to work the north field section is A. D. Mitchell who will soon start Security No. 1 at Watson & Sanderson Avenues with OPC approval of spacing.

In the northwest section Pioneer Flintkote Co. is preparing to drill on qualified acreage at Mauretania and Figueroa Streets, while Pongratz Oil Co. is getting set to drill the already approved Bristol Oil Co. location.

General Electric Issues New Motor Fitness Manual

Motor fitness requirements is the subject of a new 40-page illustrated bulletin (GED-1017) recently issued by the General Electric Company. Although primarily intended for plants converted to war production, the bulletin will prove valuable in all plants in which motors are widely used.

The bulletin discusses the following subjects in a highly comprehensive and informative manner: how to get the most service out of old and new motors, "switching" motors from one job to another, and equipping old machines with new motors.

Also, selection and application of motors, various types of motor enclosures, secondary ratings of standard integral-hp motors, ways to determine WR^2, motor maintenance, full load currents of motors, selection of a-c control, and the use of the hook-on volt-ammeter. A supplement explains how to save critical motor materials, including WPB recommendations, and information on the use of loadtime-temperature charts.

The bulletin is arranged throughout for quick reference.

FOR SALE—

Inflation Hedge—landowners royalty; Osborn Lease Rio Bravo. Box 42, c/o California Oil World. 10/20d

No. 2500 Southwestern casing head plant. Complete unit 80 horsepower Bessemer compressor. J. Hokum Co., Phone HOllywood 3931.

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Coastal District

General Starts Gato Ridge Well

General Pet. Corp. is grading roads to a site in sec. 13,8n-32w for a thorough test approximately two miles east of the south tip of the Gato Ridge field in Foxen Canyon.

The well, Giorgi No. 1, will be put down 1876 ft. north and 2699 ft. west of the southeast corner of the Jos. Giorgi property, a portion of a 2100 acre solid block which Gen. Pet. acquired from Luis E. Kemnitzer and Jim Douglas, each of whom is a well known geologist.

The play, as worked out by Messrs. Kemnitzer and Douglas, is an accumulation along the same uplift upon which is located the Orcutt, Los Flores and Gato Ridge oil fields. A discovery here would greatly augment reserves of the heavy type oil so greatly needed in our war effort.

Southeast of here, on the same general trend, Tide Water Assoc. Oil Co.'s Davis No. 1, sec. 33-8n-31w, bottomed in hard Miocene gray sand and claystone at 6643 ft. and plugged back to 5936 ft. in oil bearing chert where 6⅝ in. liner including 1321 ft. of perforation was landed and the formation circulated with 22 gravity oil.

At presstime the well was pumping to the sump at an estimated 30 bbl. per hour rate with recovery being muddy water, circulated oil and heavy formation oil. It is expected that the well will develop into a modest producer.

The zone open includes the 400 odd ft. taken in the first trial at 5050 ft. which returned some tarry oil too heavy to pump successfully, but it is thought that present completion methods, similar to that used in other Santa Barbara heavy oil producing areas, will allow the zone to properly channel in.

Security Starts Hospital Wildcat

Security Land & Royalty Co. is under way with County No. 1 in sec. 12,4n-28w, on lands of the Santa Barbara County Hospital in the Goleta area. The project was last reported at 805 ft. after cementing 10¾ in. surface casing at 750 ft.

Texaco Gets Humboldt Gas

The Texas Co. again effected gas production in the Eureka area of Humboldt county when Holmes-Eureka No. 2 sec. 22,3n-1w, was completed at 5200 ft. Allowed to stand shut in for some time pretest pressures built up to 2335/2320 lbs. The valve was cracked with a 1 in. flow bean and the well flowed gas at a 2,730,000 cu. ft. rate under 1747/2020 ft. The welcome addition to Northern California gas reserves is now shut in under 2300 lbs. pressure.

Piru District To Be Active

The Piru area of Ventura county will soon be an active spot in the Coastal District. Currently at work is Delroy Pet. Corp Fisk Core Hole No. 3, sec. 22,5n-18w, which is fishing drill collars and bit after marking up 2636 ft. of hole.

Pacific Western Oil Corp. is grading for the first of three scheduled wells with No. 15 to be drilled 1641 ft. south and 2887 ft. east of the intersection of the north line of Township 4 and the west line of Temescal Rancho, in sec. 4,4n-18w.

COASTAL COUNTIES WILDCATS

Area	Well	No.	Section	Depth	Status
	Santa Barbara County				
Careaga	Univ. Consol. Oil Co., Careaga	1	5, 8-33	5684	Drilling
Cat Canyon	Bel-Air Oil Co., Williams	1	25, 9-33	5375	Idle
	Standard Oil Co.	SBLC1	15, 9-33	6073	Coring
	Standard Oil Co., Los Flores	5	33,9-33	5595	Drilling
Gato Ridge	General Pet. Corp. Giorgi	1	13,8-32		Grade
Goleta	Security Ld. and Roy. Co. County	1	12, 4-28	805	Drilling
Lompoc	Alphonzo E. Bell Corp., Lompoc	6	28, 8-34		Grade
	Fickert Oil Co., Ltd., Well	1	8, 7-33		Rig
Los Olivos	Tide Water Assoc. O. Co., Davis	1	33,8-31	6643	Pumping
	Ventura County				
Bardsdale	Hopland Oil Co., Well	1	1, 3-19	4634	Idle
	Lytle, Robt. S., Opr., Elkins	1	6,3-19	4097	Drilling
	Santa Marino Oil Co., Elkins	1	7, 3-19		Rig
Conejo	Sycamore Oil Co., Boylan	1	23, 1-20	2747	Idle
	L. A. Basin Oil Co., Well	1	4, 1-20	1746	Suspended
Eureka Canyon	El Rika Oil Co., Well	3	33,4-18	160	Drilling
Ojai	Coates, Spencer D., Pirie	5	7, 4-22	1033	Idle
Piru	Continental Oil Co., Holser	2	14, 4-18		Grade
	Delroy Pet. Corp., Fisk C. H.	1	22,5-18	2636	Fishing D. P
	T.W.A. Oil Co. Hidden	2	5,4-18		Grading
Sespe	McCaslin, W. E., Burson	1	19,4-19	2039	Redrilling
	Merchants Pet. Corp., Cochran	5	1. 4-20	2018	Completing
	Volunteer Pet Co., Tar Creek	3	28, 5-19		Location
Timber Canyon	Crude Oils., Inc., West	1	19, 4-20	958	Idle
	Fletcher & Babcock O'Leary	1	29, 4-20		Location

NORTHERN COUNTIES WILDCATS

County	Well	No.	Section	Depth	Status
Contra Costa	Standard Oil Co., Jordan Unit	1	29, 3n-3e		Grading
Glenn	Ohio Oil Co., Willows-Block	A-1	18,20n-2e	3165	Drilling
Humboldt	The Texas Co., Holmes-Eureka	2	22-3n-1w	5200	Completed
Monterey	Loma Grande Oil Co., Corey	1	23,24s-10e	4318	Idle
	Wm. C. Jensen, Vierra	1	7-13s-2e		Rig
San Benito	Union Oil Co., Friedman	1	13,16s-12e	5774	Drilling
San Joaquin	Standard Oil Co., Blewett Com.	3	23, 3s-6e		Rig
San Luis Opispo	W'n Gulf Oil Co., Huasna Comm	1	35,31s-14e		Location
Solano	Standard Oil Co. Fontana Farms	1	23,3n-1w		Grading
	Standard Oil Co., Suisun Com.	1-2	36,4n-2w	6007	Testing
	Standard Oil Co., Suisun Com.	2-1	25, 3n-1w	7300	Testing
Tehama	The Texas Co., Walbridge	1A	32,28n-2w	1406	Drilling

On the next westerly section Tide Water Assoc. Oil Co. is grading roads and rig site for Hidden No. 2, while on section 14 of the township Continental Oil Co. is grading for Holser No. 2 in an effort to obtain better production than No. 1 found some 1000 ft. to the east.

El Rika Starts Third Coast Well

El Rika Oil Co. spudded well No. 3 on sec. 33,4n-18w in Eureka Canyon and was last reported at 160 ft.

The driller is located 400 ft. southwest of No. 2 which bottomed at 667 ft. to pump an estimated 100 bbls. gross cutting 95%.

Merchants Pet. Plans Sespe Recompletion

Merchants Pet. Corp. deepened Cochran No. 5, sec. 1,4n-20w, from 1527 ft. to 2018 ft. in oil sand and shale and is preparing to recomplete after landing liner including 700 ft. of perforation at 2005 ft.

Good shows have been reported on Sespe oil sands and shale at intervals below 1500 ft.

Two Complete In Santa Maria Valley

Two good completions were credited to the Santa Maria Valley field this week when Union Oil Co.'s Vincent No. 8 and Bush-Hancocks Rosenblum No. 4, each in sec. 25,10n-34w, were turned to the tanks.

The first bottomed at 4646 ft. after entering the Miocene at 3055 ft. and landed liner containing 1219 ft. of spot perforation at 4638 ft. to complete flowing 797 bbls. in 13 hours, 14.9 gravity cutting 6.5% thru a 1 in. casing bean.

The second finished at 4680 ft. for 892 bbls. of 14.4 gravity oil cutting only 2.8%. Each operator is working on a subsequent job in the field.

Gato Ridge Well Troubled

Barnsdall Oil Co.'s Tognazzini No. 4 on sec. 4,8n-32w of the Gato Ridge field, is plugging back to regain circulation after once marking 2018 ft. of hole. The troublesome zone is from the surface to 250 ft.

O. C. Field is having pumping trouble with the Texas Fee No. 1 and is pulling tubing after the well yielded 48 bbls. of 12.8 gravity oil cutting 36.0% in 12 hours.

Lytle Deep Test Coring

Robert S. Lytle's Elkins No. 1, Eocene test on sec. 6,3n-19w at Bardsdale, is spot coring in gray sand and red shale at 4097 ft. No markers have yet been released on the well. It is believed that San Marino Oil Co. will soon start well No. 1 on another parcel of Elkins property on the adjacent section 7.

TWAO Recompletes Ventura Ave. Well

Tide Water Assoc. Oil Co. entered the 7303 ft. V.L.&W. No. 41 to plug bottom at 6967 ft. and recomplete after gun perforating 9 in. casing at intervals from 6585 to 6700 ft. Finished on gas lift the well's high-

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est rate is 255 bbls. of 28.8 gravity oil cutting 16.4% and 142,000 cu. ft. of gas thru a 40/64 in. bean.

Kern Front Sees Flurry

Transfer of formation oil to tankage is proceeding in the Kern Front field of Kern county. Latest to the tanks was Standard Oil Co.'s No. 30 in sec. 15,28s-27e which finished at 2325 ft. to pump 117 bbls. of good oil. Standard is nearing final depth on No. 31 with the drill now at 2115 ft.

General Pet. Corp turned Young No. 1 to the tanks pumping an average 60 bbls. of 14.2 gravity oil cutting 1.8%, is completing No. 3 in oil sand at 2078 ft. and poured foundation for Wetmore No. 5, all in sec. 14,28s-27e.

Carrec Oil Co. is rigging up to drill No. 9 in the southeast quarter of sec. 11,28s-27e while Westates Pet. Corp. nears completion on Cauley No. 38 in section 16 of the township. This well bottomed at 2926 ft. to cement surface casing at 2740 ft. The company has staked locations for an additional three wells in the same section.

Coalinga Old Field Experiences Revival

Shell Oil Co., Inc., Standard Oil Co., The Texas Co., and General Pet. Corp. are each conducting a drilling program in the old Coalinga producing areas in conformance with the demand for heavy oil production.

Shell's current program employs two strings working in order on many staked sites. Latest completion was No. 77-29 on sec. 29,19s-15e which bottomed at 2730 ft. to produce 215 bbls. of 17 gravity oil cutting only 7.0%.

Standard has several projects prepared with No. 104-35A on sec. 35-19s-15e bailing for production from 2980 ft., No. 100-7C just completed at 2045 ft. and No. 113-13D on sec. 13,20s-14e drilling in sandy shale at 1380 ft.

General Pet. Corp. is drilling Esperanza No. 105 at 1625 ft. on sec. 6,20s-15e and is partially rigged up on No. 106 in the same section. The Texas Co. also is rigging up to drill No. C-3 in the same section 6.

Round Mountain Work Continues

Heavy oil development in the Round Mountain field continues its modest pace at an undiminished rate with four strings currently working and several additional projects already announced.

Honolulu Oil Corp. recently finished well No. D on sec. 18,28s-29e at 1862 ft. pumping 262 bbls. of 1417 gravity oil and is bailing on No. 11 in the same section after bottoming at 2113 ft. Top of the Vedder in this well was 2067 ft. with 6⅝ in. combination string landed at 2107 ft. and cemented through perforations at 2063 ft. The company also poured foundation for No. 31 and spudded No. 83 in the same section. The driller was last reported in grass roots at 710 ft.

Shell Oil Co., Inc.'s latest producer in the field is Olcese No. 1-12 on sec. 21,28s-29e, which bottomed at 1645 ft. to pump 21 bbls. of clean 22 gravity oil. On section 29 Shell's Jewett No. 1-16 is drilling at 1530 ft.

D. G. Vedder is running casing in No. 8 on the Bell lease in sec. 12,28s 28e after entering Vedder oil sand at 1755 ft. and bottoming at 1770 ft. The operator also is grading for well No. 12.

Lytle Proposes Interesting Test

Robt. S. Lytle, Opr., has given a drilling contract to Bell & Loffland to put down Lobre No. 43-24A as a Coalinga exploration well 990 ft. north and 330 ft. west of the center of sec. 24,19s-15e. The site lies approximately a mile west of the Coalinga Northeast Eocene shoreline accumulation and a like distance east of northerly Coalinga shallow production. Some shallow wells have been drilled in this yet barren sector with no attempt made to examine the lower geologic sections.

At the southerly flank of west Coalinga shallow production The Texas Co. seeks additional heavy oil in Boychester No. 83-18, which is preparing to spud on sec. 18,21s-15e. The company recently failed, due to mechanical trouble, on a reconditioning job in the old Boychester Oil Co. No. 1 in the northeast corner of the section.

SAN JOAQUIN VALLEY WILDCATS

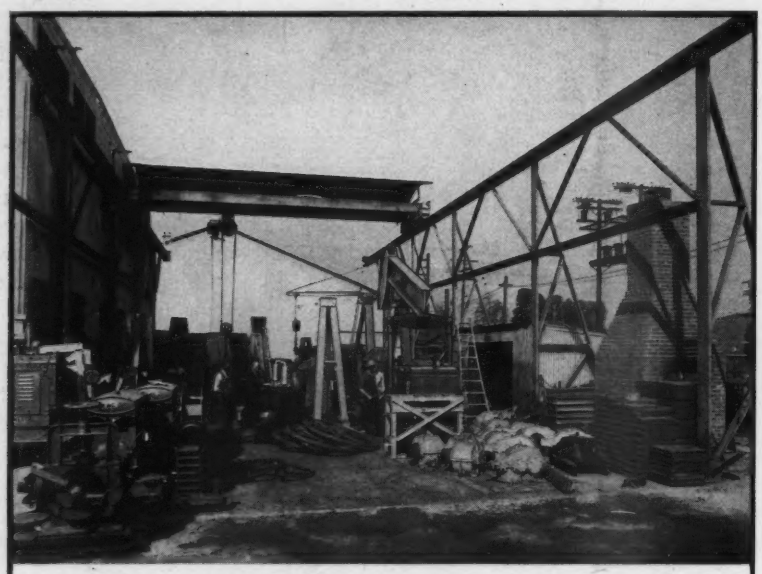
Area	Well	No.	Section	Depth	Status
Fresno County					
Coalinga	The Texas Co.	83-18	18,21-15		Rigging up
	Lytle, Robt. S., Opr., Lobre	43-24A	24,19-15		Location
Guijarral Hills	Lytle, Robt. S., Opr., Well	68-28F	28,20-16	11,586	Suspended
	Standard Oil Co., Well	82-29F	29,20-16	7741	Redrilling
Nicholson	Shell-Standard, Henderson	66-22	27, 15-15	8120	Drilling
Kern County					
Comanche Point	L. E. Barat Synd., Ham Johns	1	5,12-18	1604	Idle
	Miesse, R. S. Ham Johns	2	32,12-18	410	Drilling
Devils Den	Continental Oil Co., Mabry	3	26, 26-18		Rigging up
McFarland	T.W.A. Oil Co., Strine	35-15	15,26-26		Rig idle
McKittrick	Americal Pet. Inc., Americal	1	2, 30-21	5450	Equip. remov'd
	MacVee Assoc., Well	1	33,29-21		Rig
	T.W.A.Oil Co., Sterling	1	28,30-22		Rigging up
Midway-SE.	The Texas Co., P.U.P.	2	33, 11-23	7524	Drilling
Mt. Poso	Ring Oil Co., Glide	2	19,26-28		Rigging up
Rount Mt.	Harp & Brown, Olcese	1	17,28-29		Rig
	Iseminger Bros., Well	1	2, 28-28	215	Drilling
Strand	T.W.A.O. Co., KCL	56-8	8, 30-26	7475	Drilling
San Luis Obispo County					
Midway, NW	C.C.M.O. Co., Thomas	1	1, 31-21	4728	Drilling
	C.C.M.O. Co., Well	25-1	1, 32-22	1385	Drilling
Tulare County					
Tulare Lake	Shell Oil Co., Inc., T.S.G.	21-28	28,22-20		Driving Piles

Ring Oil Starts Mount Poso Well

Ring Oil Co. is rigging up its second Glide well on sec. 19,28s-28e in search of Vedder production off the northerly tip of the Ring-Vedder Pool. The first well, some 1000 ft. due east of the current try, bottomed in gray Vedder sand at 1960 ft., entered at 1940 ft. and was abandoned without trial. The company contemplates the start of a seven well program on sec. 29,26s-28e in the field proper.

In the field C.C.M.O. Co. finished Mon No. 7, sec. 26,27s-28e, at 1577 ft. pumping 10 bbls. of 15.6 gravity oil and is bailing for production in No. 9 at 1503 ft. Foundation is poured for No. 16.

Signal Oil & Gas Co. continues its development at the east flank of the field by bottoming Bishop-Signal No. 3, sec. 22,27s-28e, in Vedder oil sand at 1435 ft. and cementing casing at 1412 ft. The company is grading for Glide No. 23-3 on the adjacent section 23.



WE'RE *STILL* MAKING 'EM — *STILL* DELIVERING

Yes—We're still making geared pumping units of all sizes and we're making bandwheel drive units which utilize the equipment now on the well. If you have a new well with an O.P.C. approval and need a pumping unit which is completely self contained with either electric or engine drive, come to us and we will do the best we can under existing conditions to care for your needs. We have a complete line of steel-frame or wood-framed units.

On the other hand, if you have an old well in a field of low production or heavy crude and you wish to economically operate on a slow speed pumping cycle—with one of our Bandwheel Drive units and a small 4-pole motor (which are still available) you can utilize your existing equipment and still run at a profit.

PACIFIC GEAR WORKS 2053 E. 38 ST. LOS ANGELES

ASSOCIATED COMPANIES:

WESTERN GEAR WORKS—Lynwood, California
PACIFIC GEAR & TOOL WORKS—San Francisco
WESTERN GEAR WORKS—Seattle, Washington

Union Oil Co.'s S & M No. 34 on sec. 4,27s-28e bottomed at 1943 ft. in Vedder oil sand topped at 1866 ft. and after landing a 6⅝ in. combination string is bailing for grease. Ground work is finished for No.'s 35 and 36 in the same section and are awaiting equipment.

Midway-Sunset Area Booming

The most active place in California at present is the Midway-Sunset field areas in Kern county. With an average dozen strings continuously at work the fields completions are steadily increasing our heavy oil production. Owing to the shallow depth at which low gravity oil is found, involving a satisfactorily low steel consumption factor, and the vast areas which may yet be drilled on a small acreage basis, it is expected that the scores of exceptions already granted will be steadily augmented. With depths ranging from a few hundred to several hundreds of feet and geologic complexities abounding in the many field pools, returns vary as to quantity and quality, however the returns of fuel oil character are substantial in most cases and warrant continued activity.

Shell Wildcat Getting Deep

Shell Oil Co., Inc.'s joint job with the Standard Oil Co., Henderson No. 66-22, which seeks discovery in Fresno county some 15 miles west of the Raisin City field in the Nicholson area, is spot coring at 8120 ft. No formation dope has yet been released on the project which is reportedly to prospect into Cretaceous age if necessary to thoroughly examine the sites possibilities.

Williams Oil Field Gets New Producer

Shell Oil Co. finished another solid producer in its new Williams field when No. 35-6 finished at plugged depth of 2340 ft. flowing 202 bbls. of clean 16.6 gravity oil through a 24/64 in. bean under 35 lbs. flow pressure. Shell's No. 44-6 is drilling in sandstone and oil sand at 2330 ft. while cellar is excavated for No. 24-6.